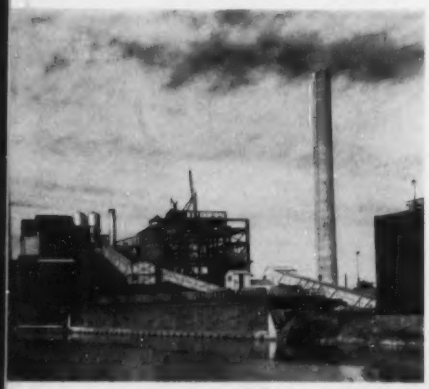
ELECTRICAL WEST

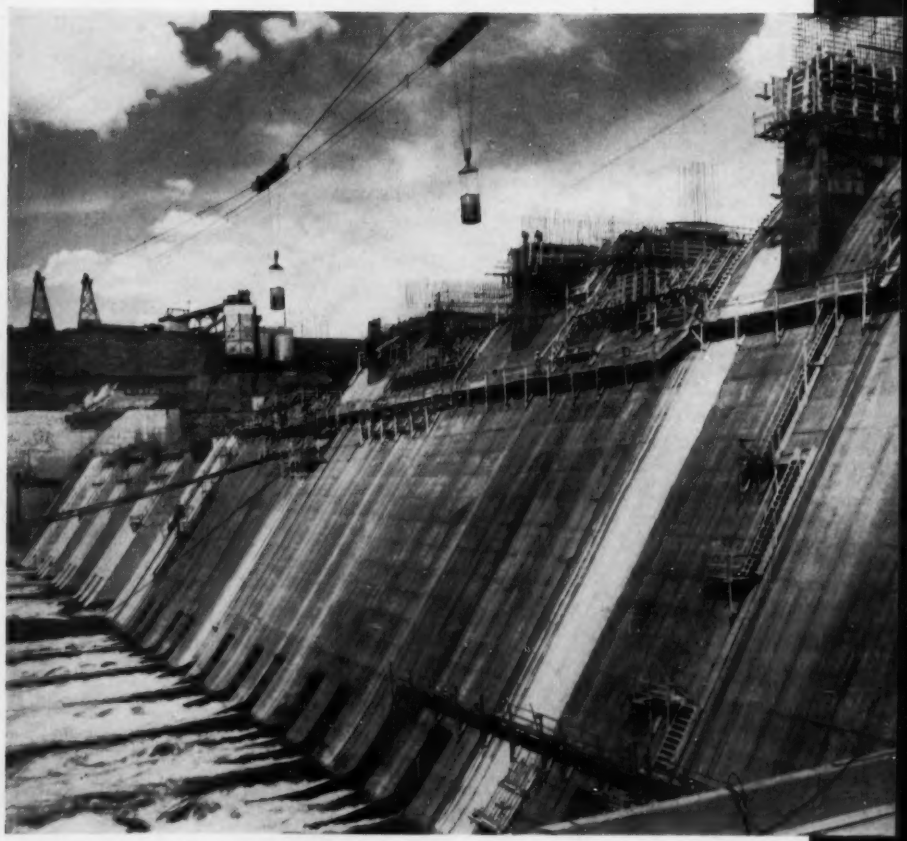
February 1954
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U.S.



Another New Steam Plant 94

More Hydro Generators.....106



Another Big Columbia River Dam.....106

Scrap and Replace.....123

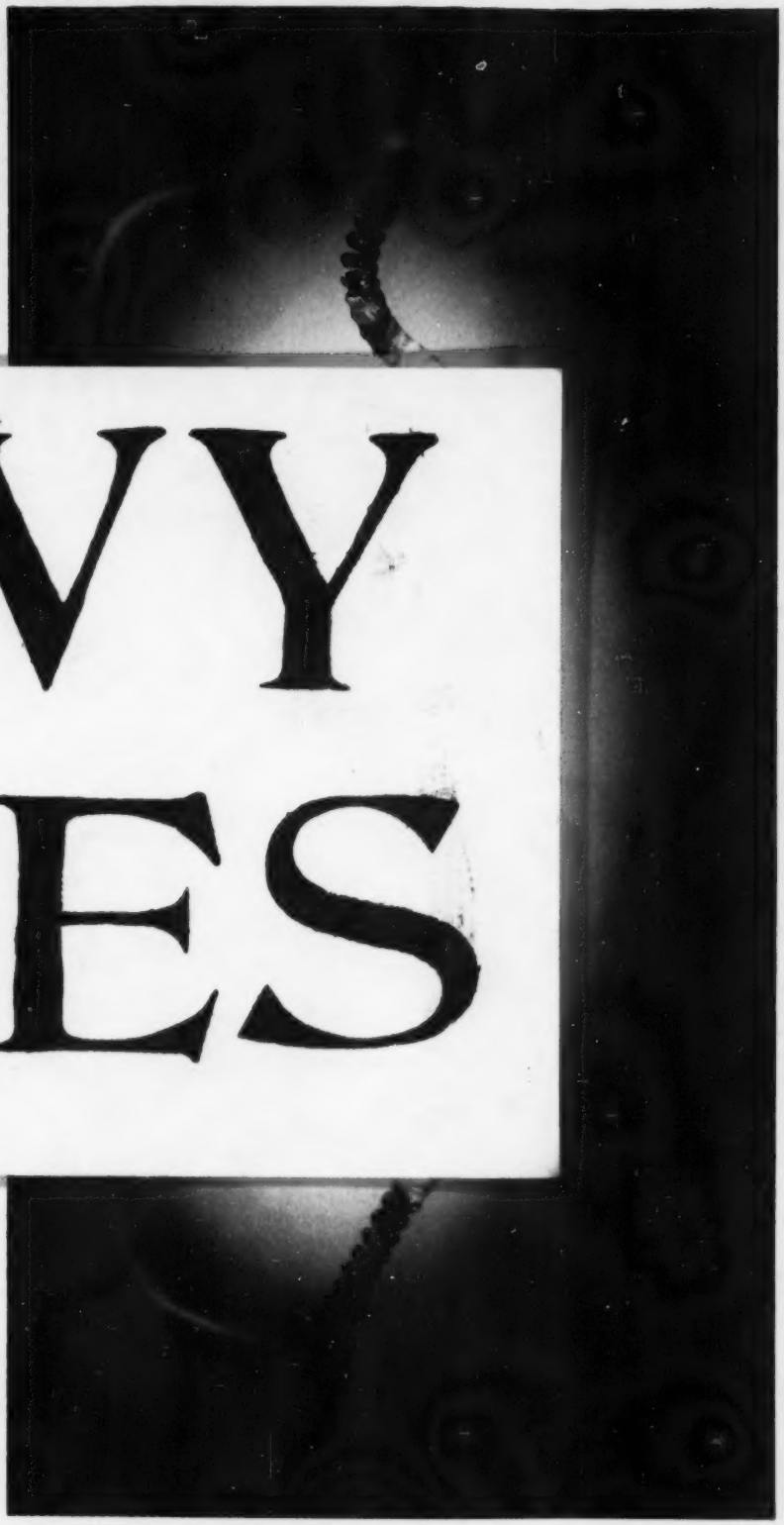
ANNUAL REVIEW AND FORECAST

There Is No Letup in Sight for Western Expansion..... 75

Western Utilities Will Increase Spending in '54..... 78

Great Changes—Now Comes the Time to Digest Them.....112

Luxury costs so little...
everyone can have it—electrically!
Having your wishes obeyed instantly and automatically when you lift a finger—why, that's luxury such as people only dreamed about for years! But just lift your finger to flick a switch, and now electricity will make your coffee, toast your bread, cook your meals, bring you light, warmth, entertainment—any number of things. What is more, all these wonders are part of your every day living, and everyone else's, too. You don't need a "luxury income" to buy electricity—it's today's biggest bargain.
SOUTHERN CALIFORNIA EDISON COMPANY
Let's talk
"Luxury"
Luxury costs so little...
everyone can have it—electrically!
If your idea of luxury is taking your ease while servants do your housework, well that's what you have, with electricity! You can relax while meals are cooked, laundry is washed and water is heated. There are really only two things about electricity which lead you to forget that it's a luxury: One, your electric servants are silent and unobtrusive. Two, you don't need a "luxury income" to buy electricity—it's today's biggest bargain.
SOUTHERN CALIFORNIA EDISON COMPANY
WA
PAG
Luxury costs so little...
everyone can have it—electrically!
It seems hard to believe, but there was a time—and not so very long ago—when having fresh food at every meal was considered a luxury. It's hard to believe because these days everyone can do it, and without even the need for daily shopping trips. Electric refrigeration has just about dropped good eating out of the luxury class—it's just another of the taken-for-granted items in everyday living. You don't need a "luxury income" to buy electricity—it's today's biggest bargain.
SOUTHERN CALIFORNIA EDISON COMPANY
Luxury costs so little...
everyone can have it—electrically!
We'll probably have to remind most people that good lighting is a luxury, since wonder-working electricity has made it so commonplace. For all that, artificial light which rivals daylight for seeing purposes and is available anywhere and any time really is a luxury. What is more, electric light is so low in cost that you can use as much as you like, as often as you like. You don't need a "luxury income" to buy electricity—it's today's biggest bargain.
SOUTHERN CALIFORNIA EDISON COMPANY
Southern
California Edison
Company
Edison



New twist on old idea makes G-E fluorescent lamps last longer

ONE of the most important materials in a fluorescent lamp is the little bit of chemical at each end of the tube. The current flows through it, electrons flow out, and the lamp starts to glow.

The old idea was to hold the chemical on a double-twisted wire coil. General Electric's new idea was to go that one better: give the wire a *triple* twist. This not only holds more chemical, it also holds it longer.

The result of course is longer lamp life and more light for your money.

General Electric's triple coil is used in G-E slimline and other G-E instant-start lamps. Just one more example of why...

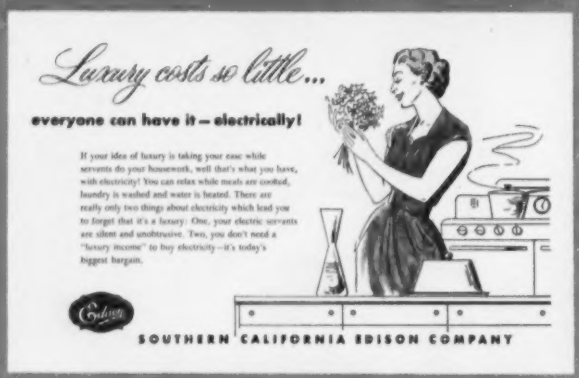
You can expect the best value from General Electric fluorescent lamps

You can put your confidence in—

GENERAL ELECTRIC

Luxury costs so little...
everyone can have it—electrically!
Having your wishes obeyed instantly and automatically when you lift a finger—why, that's luxury such as people only dreamed about for years! But just lift your finger to flick a switch, and now electricity will make your coffee, toast your bread, cook your meals, bring you light, warmth, entertainment—any number of things. What is more, all these wonders are part of your every day living, and everyone else's, too. You don't need a "luxury income" to buy electricity—it's today's biggest bargain.
SOUTHERN CALIFORNIA EDISON COMPANY

Let's talk "Luxury"


Luxury costs so little...
everyone can have it—electrically!
If your idea of luxury is taking your ease while servants do your housework, well that's what you have, with electricity! You can relax while meals are cooked, laundry is washed and water is heated. There are really only two things about electricity which lead you to forget that it's a luxury: One, your electric servants are silent and unobtrusive. Two, you don't need a "luxury income" to buy electricity—it's today's biggest bargain.
SOUTHERN CALIFORNIA EDISON COMPANY

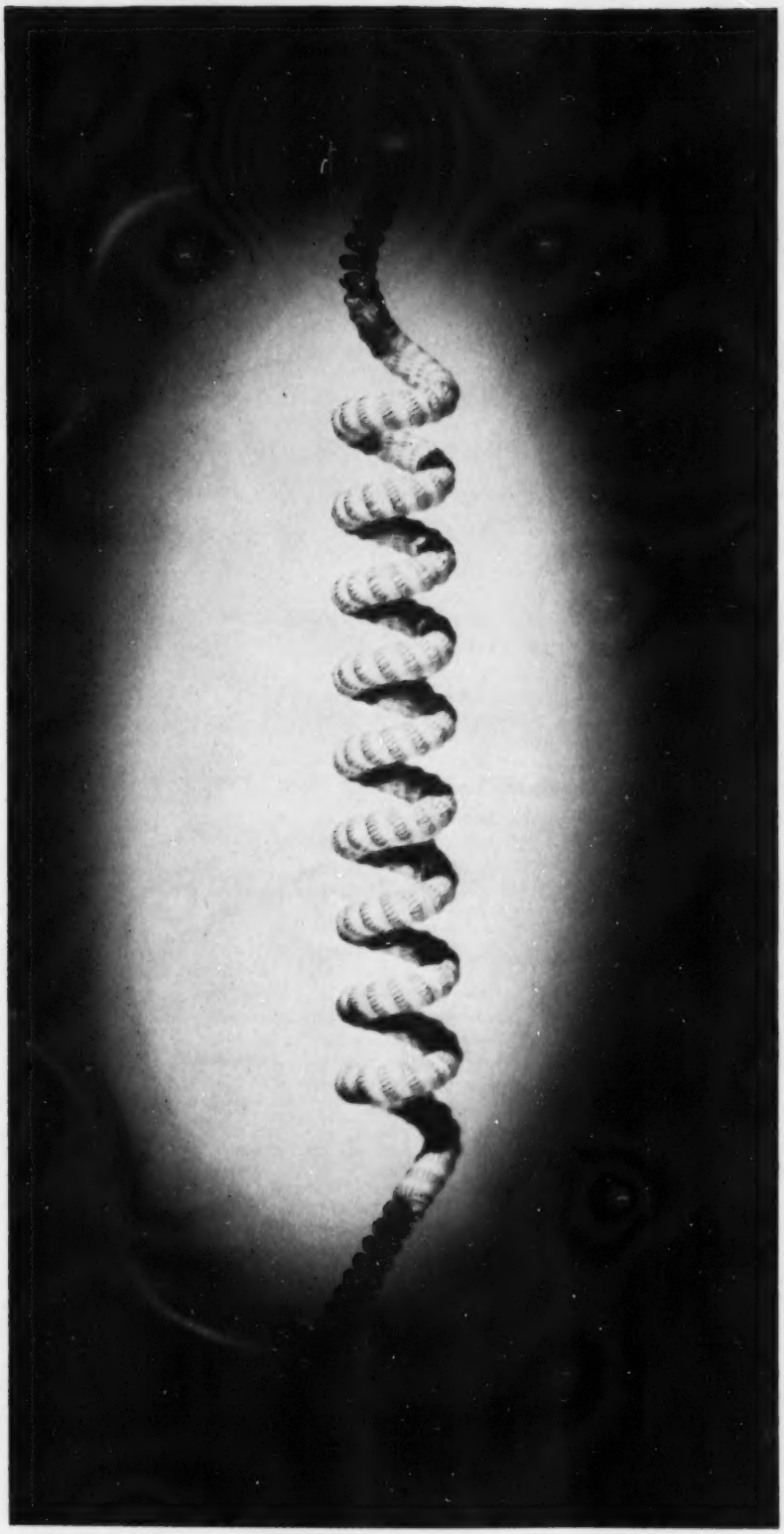
One of the nicest—and one of the truest—things to be said for electricity is that it has made luxury commonplace in every home. Strangely enough, it is something which *needs* saying, we believe.

Most people don't think of the services electricity brings them as "luxuries" at all. They are simply taken-for-granted parts of daily living, so low in cost that everyone has them. That is why it seems like a good idea to do some reminding—as we are doing in this current series of newspaper advertisements—that a magic power, translated into living reality by lamps and appliances, has made today's average home a far better place to live in than the most lavish residences of the days before electricity.

Luxury costs so little...
everyone can have it—electrically!
It seems hard to believe, but there was a time—and not so very long ago—when having fresh food at every meal was considered a luxury. It's hard to believe because these days everyone can do it, and without even the need for daily shopping trips. Electric refrigeration has just about dropped good eating out of the luxury class—it's just another of the taken-for-granted items in everyday living. You don't need a "luxury income" to buy electricity—it's today's biggest bargain.
SOUTHERN CALIFORNIA EDISON COMPANY

Luxury costs so little...
everyone can have it—
electrically!
We'll probably have to remind most people that good lighting is a luxury, since wonder-working electricity has made it so commonplace. For all that, artificial light which rivals daylight for seeing purposes and is available any-where and any time really is a luxury. What is more, electric light is so low in cost that you can use as much as you like, as often as you like. You don't need a "luxury income" to buy electricity—it's today's biggest bargain.
SOUTHERN CALIFORNIA EDISON COMPANY

Southern California Edison Company



New twist on old idea makes G-E fluorescent lamps last longer

ONE of the most important materials in a fluorescent lamp is the little bit of chemical at each end of the tube. The current flows through it, electrons flow out, and the lamp starts to glow.

The old idea was to hold the chemical on a double-twisted wire coil. General Electric's new idea was to go that one better: give the wire a *triple* twist. This not only holds more chemical, it also holds it longer.

The result of course is longer lamp life and more light for your money.

General Electric's triple coil is used in G-E slimline and other G-E instant-start lamps. Just one more example of why...

You can expect the best value from General Electric fluorescent lamps

You can put your confidence in—

GENERAL ELECTRIC

FEBRUARY 1954

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright, Sixty-sixth year of publication

VOL. 112
NO. 2

ELECTRICAL WEST

George C. Tenney, Editor
W. A. Cyr, Associate Editor
Peggy Boyer, Associate Editor
Walter C. Heston, Engineering Editor
John Cootz, Typography

Next Month

Electric utilities are vitally concerned with the weather — obviously. Next month we are going to talk about the weather. One article will be by a nationally known meteorologist. He will tell why power companies should have their own meteorologist.

Another article will give results of experiments on cloud formations with balloons carrying dry ice.

Measuring the water content of snow by using radioactive isotopes and automatic radio transmission of the information will be covered pictorially.

Electronic equipment that will continuously monitor energized transmission lines and locate faults within plus or minus 1,000 ft. is now undergoing its first field test. Results of that test will be reported in exclusive coverage.

A pictorial preview of the atomic engine for the submarine Nautilus will be of great interest.

Equipment that greatly expedites temporary splicing of broken transmission conductors was used recently by one of our utilities to reduce outage time. Look for the story.

Other articles will cover: Denver airport lighting, San Quentin protection lighting, G-E wonder home in Phoenix, bridge lighting, a luminous ceiling job and a discussion of the health and welfare plan that concerns unions and contractors.

CONTENTS

35th Annual Review and Forecast

There Is No Letup in Sight for Western Expansion 75

Forecasts and figures for 1954 indicate only a slight slackening of expansion in the West over the year past.

Western Utilities Will Increase Spending in '54 78

For the first time nonfederal utilities budget exceeds a half billion dollars. Total peak was up 8.35% over 1953. New generation planned for this year totals surprising figure of 2,399,134 kw.

Great Changes—Now Comes the Time to Digest Them . . 112

What's in store in '54 summed up quickly and then the opinions of the sales executives of the utilities in the West as to business prospects for this year in their respective trade areas.

DEPARTMENTS

Associations	133	Letters to the Editor	30
Book Reviews	36	New Products	50
Bulletins	64	News	140
Contractors' News Letter	125	PCEA	135
Editorials	136	Sales Guide News Letter	129
Electra's Husband	68	Advertising Index	170

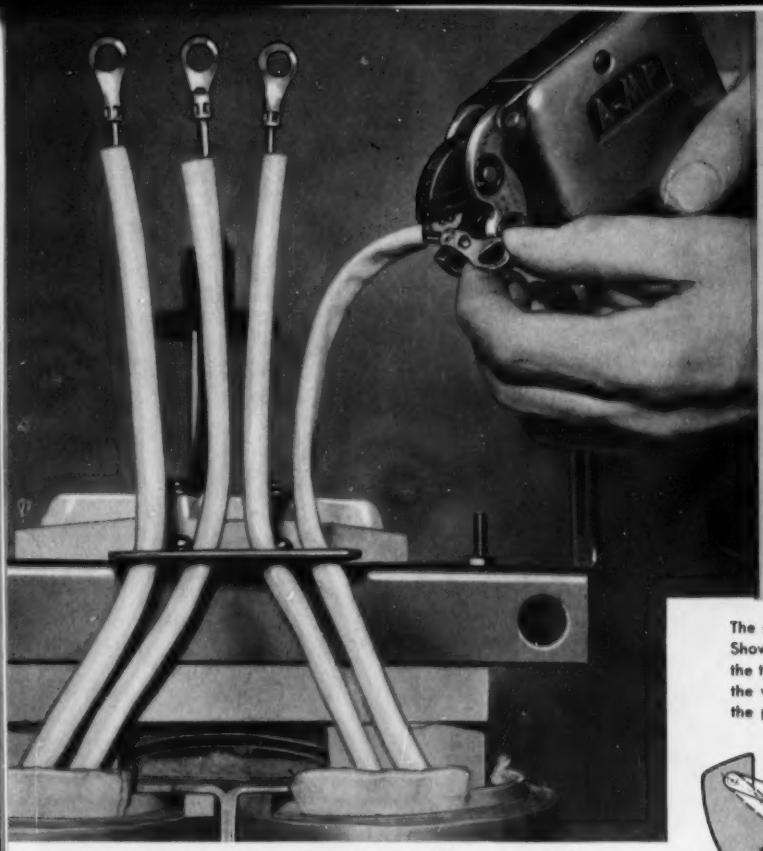
Cover photos: Chief Joseph Dam, Army Engineers; Zuni steam plant, Public Service Co. of Colorado; Rock Island power house, Chelan PUD; Old ranges go to scrap heap, B. C. Electric Co., Vancouver

ADVERTISING REPRESENTATIVES

Chicago (11) . . . . . Michael I. O'Connell, 520 N. Michigan Ave.
Los Angeles (17) . . . . . Carl Dysinger, 1111 Wilshire Blvd., MA 6-4323
New York (36) . . . . . Walter Klein, 330 W. 42nd St.
San Francisco (4) . . . . . Tom Carmody, Dick Alcorn, 68 Post St., DO 2-4600
Offices: Atlanta, Boston, Cleveland, Dallas, Detroit, Philadelphia, Pittsburgh, St. Louis

THE ELECTRICAL WEST EDITORIAL ADVISORY BOARD — UTILITIES: N. R. Sutherland, Vice-President and General Manager, Pacific Gas and Electric Company, San Francisco; J. A. Hale, Vice-President, Utah Power & Light Company, Salt Lake City; Glenn L. Jackson, Vice-President, the California Oregon Power Company, Medford; Kinsey M. Robinson, President, Washington Water Power Company, Spokane; J. H. Polhemus, President and General Manager, Portland General Electric Company; W. C. Mullendore, President, Southern California Edison Co. Ltd., Los Angeles. MANUFACTURERS: J. H. Pengilly, Executive Vice-President, Square D Company, Los Angeles; R. A. Neal, Vice-President, Westinghouse Electric Corporation, San Francisco; Ray Turnbull, Vice-President, General Electric Company, San Francisco. WHOLESALERS: A. H. Meyer, Leo J. Meyberg Co., San Francisco and Los Angeles; Harry C. Gerster, Vice-President, General Electric Supply Co., Los Angeles. CONTRACTORS: Teo L. Rosenberg, T. L. Rosenberg Co., Oakland; Don Larson, manager, Rocky Mt. Chapter, NECA, Denver. DEALERS: K. L. Hampton, manager, Valley Electrical Supply Company, Fresno; J. C. Chamberlain, Sec.-Mgr., Bureau of Home Appliances of San Diego County, San Diego, California.

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), FEBRUARY, 1954, Vol. 112, No. 2. Published monthly by McGraw-Hill Company of California. **Publication office, 1111 Wilshire Blvd., Los Angeles 17, California. Executive, Editorial and Advertising Offices: 68 Post St., San Francisco 4, Calif.** James H. McGraw (1860-1948), Founder; Donald C. McGraw, Chairman of the Board; George C. Tenney, President; John W. Otterson, Vice-President; B. M. Baccoli, Secretary and Treasurer. **Subscriptions: Address correspondence to Electrical West—Subscription Service, 68 Post St., San Francisco 4, Calif. Allow 30 days for change of address. Please indicate position and company connection on all subscription orders.** Single copies 25c. Subscription rates—U. S. possessions and Latin American Republics: $2 a year; $3 for two years; $4 for three years. Canada $2.50 a year; $5 for three years. All other countries $3 a year; $5 for two years; $6 for three years. Entered as second class matter April 17, 1947, at the post office at Los Angeles, Calif., under the act of March 3, 1879. Printed in U.S.A. Copyright 1954 by McGraw-Hill Company of California. All rights reserved.

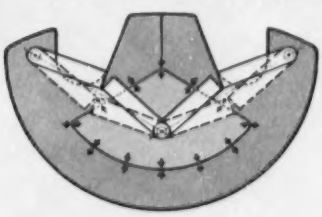


Connections are made by pneumatic hand tools which automatically put the proper pressure on the swaged joint. The W-crimp forms all strands and terminal into substantially one solid, low-resistance piece of metal.

Two solid wires secured in one terminal. As shown in the cross section, the copper fills the entire area, and any relaxation of the copper simply tightens the connection.

Two solid and one stranded wire secured in one terminal. All three are firmly held. The joint has less resistance than the conductors themselves, the wires cannot loosen, and the joint remains completely free from corrosion.

The sketch illustrates the "locked lever" principle utilized in the W-crimp. Shown outlined by solid lines are imaginary toggle arms which represent the theoretical condition existing prior to making the crimp. After crimping, the wire is locked in position by the deformed terminal, as illustrated by the position of the phantom toggle indicated by the broken lines.



Note how the toggle action of the W-crimp prevents the conductor from assuming its original shape, and any tendency toward cold-flow actually increases the pressure between the conductor and the terminal connector. The arrows indicate pressure exerted between the conductor and the connector.

W-Swaging Assures Strong, Corrosion-Proof Connections on L-M Round-Wound Transformers

by **R. W. BECKER**
Manager
Quality Control Department
Transformer Division
Line Material Company

Internal connections in our transformers must be strong, have low resistance, and be corrosion-proof. Some years ago we conducted extensive experiments with the usual methods—soldering, brazing, welding, and with a variety of swaged connectors.

Finally we standardized on the W-crimp type of swaging, a development of the Aircraft-Marine Products Company. L-M was the first transformer manufacturer to use this improved method. In nearly six years of use we have had practically no complaints because of connector failure.

In the W-crimp which we use, advantage is taken of the tendency of copper to "relax"—to resume its original form. After being deformed by the action of the precisely controlled indenting tool upon the connector and conductor, the conductor tends to cold-flow. However, through the scientific "locked leverage" principle utilized in the design of the terminal indentations, forces due to cold-flow in the conductor are so restrained that contact pressures are increased, and the resistance of the joint actually becomes lower as the swaged connection ages.

The advantage of this type of swaged connection is especially important where solid conductors are joined. These often show a tendency to loosen with other styles of crimped connections. Stranded conductors, relatively simple to join by other pressure-type connectors, are even more satisfactorily joined by W-crimps.

Principal advantage to the user of Round-Wound transformers is that he need not worry about internal connections. They do not pull out or break, even under most adverse conditions. The wire is not weakened by crystallization because no heat is required to make the joint. They do not corrode. There is no radio noise problem. Resistance is as low as, or lower than, the resistance of the wire itself.

This is one of many quality "extras" that may not be seen by the user but that have helped build the fine reputation of Round-Wound transformers for performance and long life.

Get Details on Construction of L-M Round-Wound Transformers

Ask the L-M Field Engineer for a copy of Bulletin DT1, which describes the manufacture of "Round-Wounds" or write Line Material Company, Transformer Division, Zanesville, Ohio (a McGraw Electric Company Division).

"Round-Wound" is a Line Material Company trademark

LINE MATERIAL

LM

Transformers

159

DROP-FORGED

Stronger-Lighter

Efficient

Full Range of Sizes

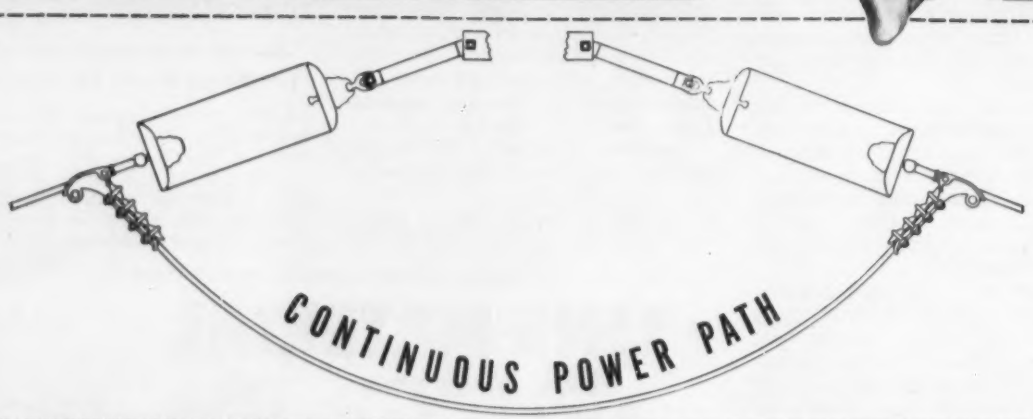
Cool Operation

Economical

Increased Conductor Life

MINIMUM POWER LOSS

High Slip Strength



for GREATER STRENGTH

BTC

M.P.L. ALUMINUM

STRAIN CLAMPS

for A.C.S.R. and All-Aluminum Conductors

M.P.L. MINIMUM POWER LOSS

It has been proved that the use of a non-magnetic Aluminum Clamp Body reduces hysteresis and eddy current losses to a minimum. The actual power loss in M.P.L. Clamps is approximately one-tenth of that in all-ferrous Clamps.

HEATING EFFECT

High amperage current raises the temperature of the conductor within ferrous Clamps beyond safe limits, anneals the conductor, materially reduces its strength and fatigue resistance and has been the current-limiting factor on some systems. The clamped conductor and the M.P.L. Clamp operate at lower temperature than that in the span.

HIGH STRENGTH, LIGHT WEIGHT

Forgings, in any metal, are invariably employed where better strength, soundness and finish are required than can be obtained by other processes. Forging produces a fine, close-grained structure with grain flow following the contour of the part. It develops optimum mechanical properties and ability to withstand severe loading, sudden shock and frequent reversal of stress. The M.P.L. Clamp Body is Forged Aluminum alloy, fully heat-treated. In the heat-treated condition, the ultimate strength and hardness are more than twice (and the yield strength and endurance limit more than three times) that of alloys used in other processes. Catalogued strength ratings are conservative and are exceeded in actual tests. Undesirable weight is eliminated without sacrifice of strength.

SLIP STRENGTH

High holding power is attained by the combination of snubbing action and wave form body and keeper.

CONDUCTOR LIFE

M.P.L. Strain Clamps are designed to minimize the effects of conductor vibration. The light weight assembly with separate, rather than integral, connecting arms is free to oscillate at a point near to its center of mass, effecting a low moment of inertia and allowing the free passage of vibration waves. Generous snubbing radius of Clamp mouth prevents severe concentration of bending and tension stresses.

CORROSION

The close-grained, non-porous structure of the Forged Aluminum Alloy Body effectively prevents the destructive internal seepage of corrosive elements, disintegration of metal and eventual failure.

ECONOMICAL, PERMANENTLY EFFICIENT

M.P.L. Strain Clamps offer low initial cost—easy, quick installation—no cutting or lowering of the conductor— no special tools or cumbersome installation devices—no trouble inviting bolted jumper loop connectors—and no interruption of continuous power path through the jumper loop.

FULL RANGE OF SIZES

The M.P.L. line offers a choice of exactly the right Clamp for each size of A.C.S.R. or All-Aluminum Conductor. The close dimensional fidelity of the die-forged parts makes unnecessary any bore size allowance for manufacturing variations in the Clamps.

Specify BTC M.P.L. Aluminum Strain Clamps from your insulator manufacturer. They are an important part of BTC's complete line of forged transmission line hardware.

Sold Through Your Insulator Manufacturer Only

Drop Forged BTC *Hi-Line Hardware*

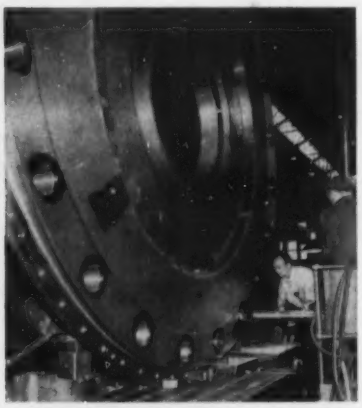
The BREWER-TITCHENER Corporation

Cortland · New York

FOUR 17,000 HORSEPOWER BALDWIN FRANCIS TYPE TURBINES INSTALLED AT FORT GIBSON

FORT GIBSON DAM—This view shows (center of photo) the powerhouse in which these turbines are installed.

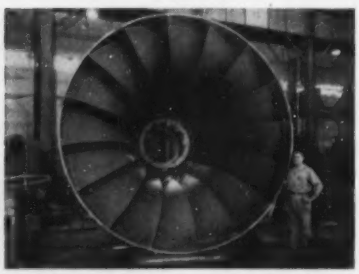
BALDWIN FRANCIS TYPE TURBINE RUNNER AND SHAFT shown above being lowered into position at Fort Gibson. The total weight of these two parts is 110,400 pounds.



TURBINE MANUFACTURING requires lots of big, precise machine tools to handle the machining of large head covers such as the ones used at Fort Gibson.

THE HEAD COVER, MAIN BEARING AND MAIN SHAFT are shown in the above photo. The workers are busy positioning the guide bearing.

One of the foremost in the design and manufacturing of hydraulic turbines for over 100 years, Baldwin-Lima-Hamilton, together with its subsidiary, the Pelton Water Wheel Company, is among the few firms in the country with the facilities and experience required to produce such important equipment.



DISCHARGE END OF THE RUNNER is shown in this shop view prior to being shipped to the powerhouse site.

BALDWIN-LIMA-HAMILTON

Philadelphia 42, Pa. • Offices in Principal Cities

BALDWIN BLH LIMA-HAMILTON

Not by a dam site

Appliances, commonplace in today's living, are in the *home* . . . far removed from the *dam site!* In between, is a problem . . . voltage regulation . . . the result of long line voltage drop. To eliminate the problem a pole type step voltage regulator can be introduced into your distribution system where the load exists. The particular demands of your system will determine where you install the regulators.

The features of pole type step voltage regulators will determine what regulator you will install. Specify and install Moloney Pole Type Feeder Voltage Regulators because . . .

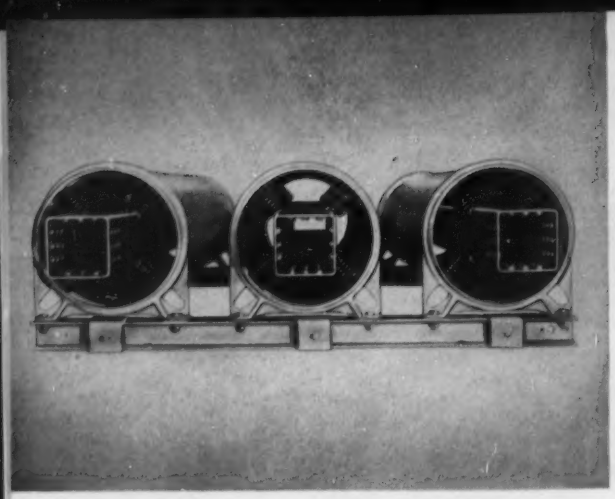
MES4-2

- COMPLETELY SELF CONTAINED
- FLEXIBLE CONTROL CABINET MOUNTING
- HIPERCORE WOUND CORE DESIGN
- COMPLETELY OIL IMMERSED UNIT
- GREATER ARC CLEARANCES
- SPRING LOADED ACTION ON THE SELECTOR SWITCH
- SENSITIVE, ACCURATE CONTROL SYSTEM
- FULLY AUTOMATIC OPERATION
- QUICK, EASY INSTALLATION
- LONG, TROUBLE-FREE OPERATING LIFE

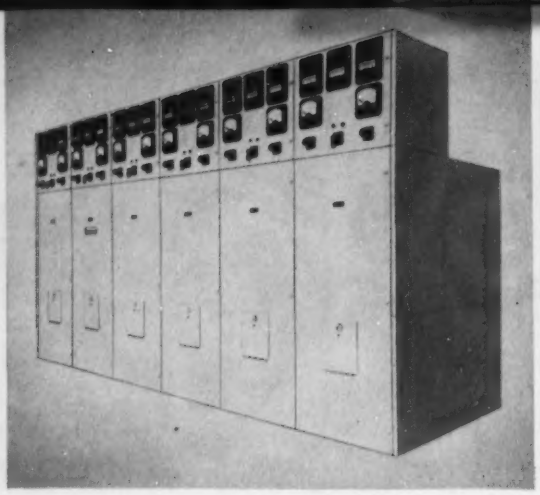
MOLONEY ELECTRIC COMPANY

Manufacturers of Power Transformers • Distribution Transformers • Load Ratio Control Transformers • Step Voltage Regulators • Unit Substations

SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS, MO. AND TORONTO, ONT., CANADA

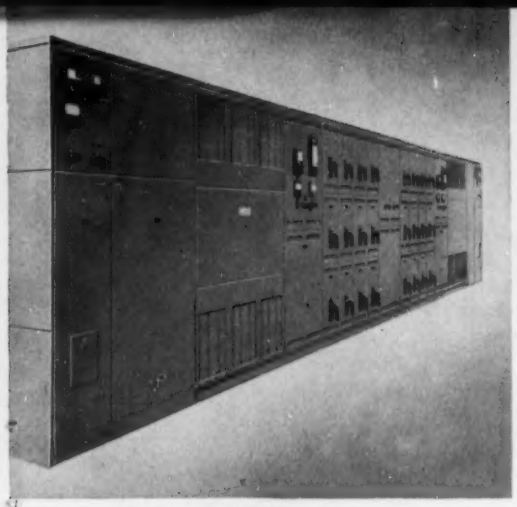


METAL-ENCLOSED BUS STRUCTURES

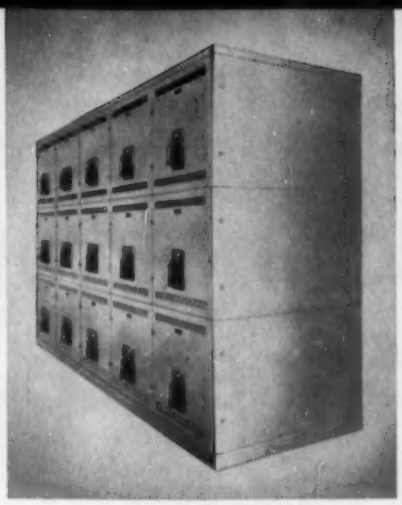


METAL-CLAD SWITCHGEAR

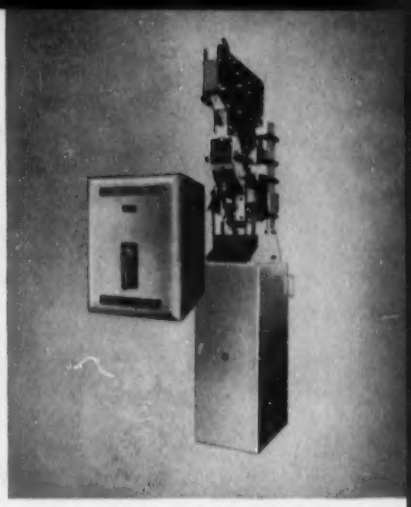
Put I-T-E



UNIT SUBSTATIONS



LOW-VOLTAGE SWITCHGEAR



LARGE AIR CIRCUIT BREAKERS

in your power plans...

for Dependability, Safety, and Over-all Economy

A complete line of Quality Switchgear Equipment

From generation to utilization, I-T-E quality equipment serves every industrial and commercial application. Whether your plans include bus structures, metal-clad or low-voltage switchgear, unit substations, or individual circuit breakers—you are assured of I-T-E's many *extra-service* benefits, which include:

1. selection and application of equipment
2. preparation of specifications
3. coordination of all job requirements

Power is fundamental in any new plant construction or expansion. Power distribution systems must be planned to assure maximum dependability of service, safety for personnel and equipment, and *over-all* economy—from initial planning . . . through the life of the equipment.

Furthermore, it is important to plan power systems with an eye to the future. They should be adaptable to changing plant requirements for many years ahead.

For these reasons, it pays to include I-T-E quality products in your power plans. For over 65 years I-T-E has set the standard for the industry—through engineering skill, design refinement, and introduction of new ideas and thinking.

For details, contact the I-T-E field office nearest you. Look in your classified telephone directory under "Electrical Equipment."

THE SYMBOL OF QUALITY SWITCHGEAR

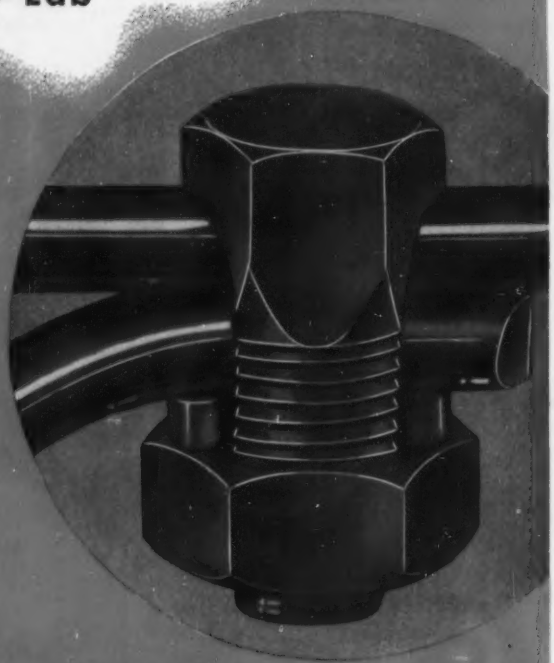
I-T-E CIRCUIT BREAKER COMPANY

19TH AND HAMILTON STS. • PHILADELPHIA 30, PA.

SWITCHGEAR PRODUCTS

Startling new connector performance...

from the Chemistry Lab



Here's News!... BLACKBURN has perfected an amazing new and exclusive chemical process—the CFC Process*—which drastically reduces thread friction... Result—over 25% increase in clamping force, to make the outstanding BLACKBURN Connector even better.

Tests show that high pressure connections on copper conductor have lower resistance—stay tighter—and give you lasting, trouble-free service.

This new discovery means that every BLACKBURN Hi-Strength Connector for copper connections *makes* and *holds* a *maximum-pressure* connection—an absolutely dependable connection that will stay tight and trouble-free year after year.

**Chemical Friction Control Process—Patent Pending*

CFC Processed for improved high-pressure connections

BLACKBURN *Hi-Strength* CONNECTORS

GENERAL ELECTRIC SUPPLY COMPANY

A DIVISION OF GENERAL ELECTRIC DISTRIBUTING CORPORATION

SAN FRANCISCO • OAKLAND • SACRAMENTO • STOCKTON • FRESNO • LOS ANGELES • SAN BERNARDINO • LONG BEACH
SAN DIEGO • BAKERSFIELD • PHOENIX • TUCSON • SEATTLE • PORTLAND • MEDFORD • TACOMA • SPOKANE

POWERS American

SERIES HD-1

"Pole-Master"

fully-powered HYDRAULIC DERRICK

- LIVE BOOM — CAN BE OPERATED UNDER LOAD
- INFINITE OPERATING POSITIONS
- REQUIRES ONLY SINGLE-DRUM WINCH
- LIFTS LOADS TO BODY PLATFORM
- NO CENTER LEG TO OBSTRUCT BODY CARGO AREA

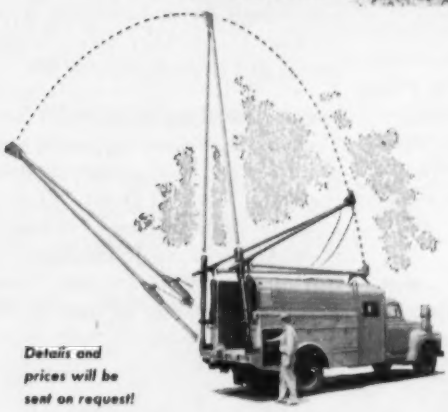
"The Accepted Standard with Utilities Everywhere"

Operation of the Series HD-1 derrick is *completely hydraulic.* It is raised to working position, elevated or lowered to desired height, and returned to carrying position . . . hydraulically.

There is no mechanism to endanger workmen — no center leg to obstruct the body cargo area — no manual operation, other than insertion and removal of locking pins, and shifting of hydraulic control levers.

This is a *heavy-duty* derrick which will handle poles up to 55 ft. in length — under the most severe operating conditions.

Capacity, with head sheave 5′ to rear of body, is 6000 lbs. When extended to 14′, capacity is 2500 lbs.



Details and prices will be sent on request!

THIS IS A "Live Boom" DERRICK

There are no pre-determined "stops" to limit operation of the derrick. It can be spotted in an unlimited number of positions, and moved at any time — even while supporting a full load.

Twin hydraulic rams raise the derrick from carrying position to working position in less than a minute. When derrick is spotted, a poppet-type control valve seals oil in cylinders to prevent "kick back" or "creeping"

POWERS-AMERICAN DIVISION

McCABE-POWERS AUTO BODY COMPANY

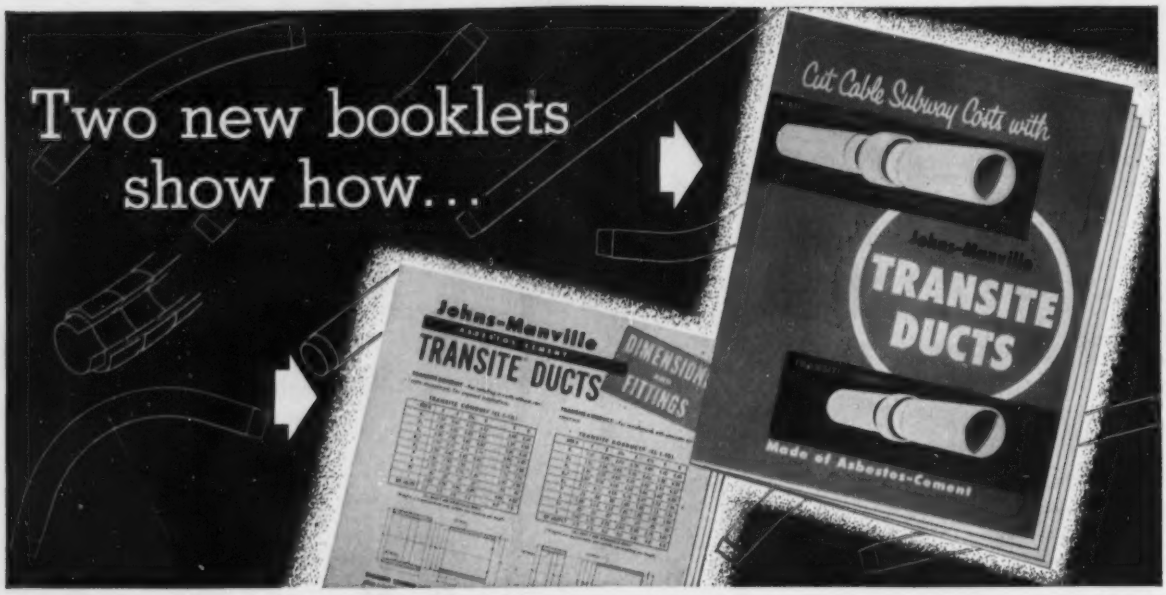
5900 NO. BROADWAY • ST. LOUIS 15, MO.
428 LATHAM SQ. BLDG. • OAKLAND 12, CALIF.

Available in Western States from the following:

PACIFIC BODY BUILDERS, Inc.
1812 N. E. Grand Ave.
PORTLAND, OREGON

UTILITY TRAILER & EQUIP. CO.
3400 Sixth Ave., South
SEATTLE, WASHINGTON

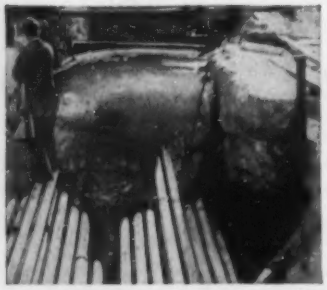
WIN WARD COMPANY
962 Price St.
POMONA, CALIFORNIA



Transite® Ducts cut cable subway costs—

give greater cable protection

Transite Conduit is the thicker walled duct which is used for exposed work or is laid directly in earth without a concrete encasement. Saves time, labor and materials on the job



Transite Korduct® is the thinner walled duct for installation in concrete. Inasmuch as it is used principally for hi-voltage lines, its high thermal conductivity reduces operating losses

• Johns-Manville presents these brochures as a service to public utilities, design engineers, and all other users and planners of cable subway systems. "*Transite Ducts*" shows how improved cable subway protection, installation, maintenance and operational savings may be achieved. "*Transite Ducts, Dimensions and Fittings*" give the necessary dimensional data on all ducts and fittings.

Transite Ducts offer improved cable subway protection. Made of asbestos and cement, Transite cannot burn, smoke, fume or generate explosive gases. Transite confines arc damage and protects adjacent cables against heat and flame. Transite resists corrosive action of soils; is unaffected by electrolysis.

Installation savings result because Transite is strong, light in weight, easy to handle. It comes in long, 10-foot sections, thus, fewer joints are required. Its permanently smooth bore prevents injury to cable either from natural movement or when pulling cable through. Maintenance savings result from the permanent nature of the asbestos cement composition of Transite. It is as durable as stone.

Moreover, operational savings result because cables run cooler due to the high thermal conductivity of Transite Ducts. This also results in prolonged cable insulation life.

For complete details on how Transite Ducts can cut cable subway costs for your system, send for copies of "Transite Ducts," EL-29A and "Dimensions and Fittings," EL-45A. Write to Johns-Manville, Box 60, New York 16, New York. In Canada, 199 Bay Street, Toronto 1, Ontario.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville TRANSITE DUCTS

TRANSITE KORDUCT—for installation in concrete

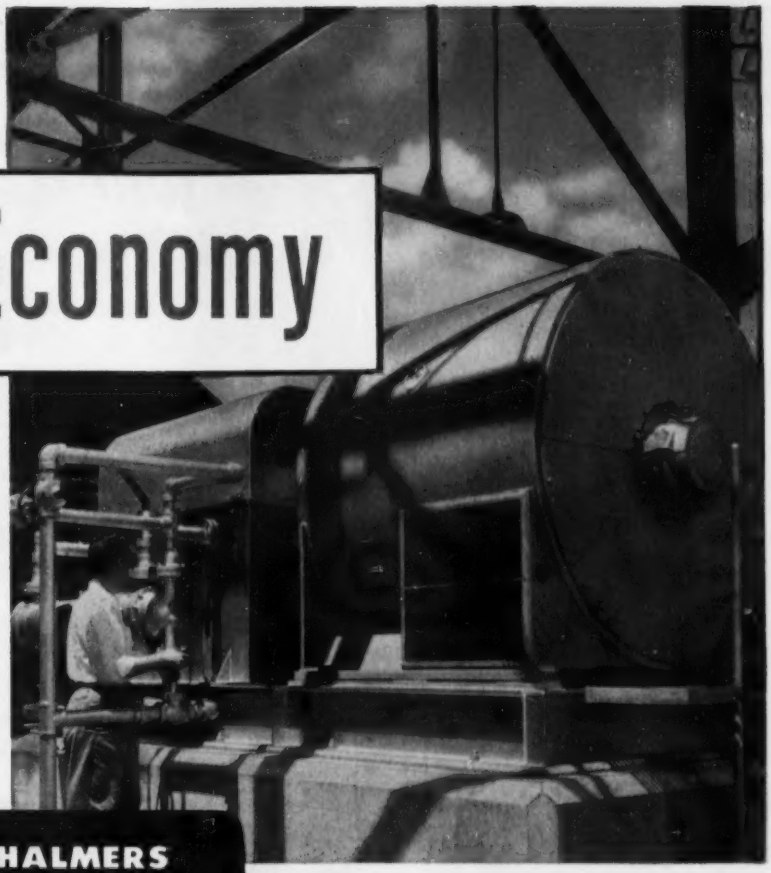
TRANSITE CONDUIT—for exposed work and installation underground without a concrete encasement

3-Way Economy

OPEN SKY is all the roof they need

MAINTENANCE is cut to the minimum

RELIABILITY assures maximum availability



ALLIS-CHALMERS
Tube-Type
TEFC MOTORS

Induced-draft fan motor for A-C turbine-generator equipped installation at Georgia Power's Plant McManus is rated 900 hp, 2300 volts, 705 rpm.

WITH Allis-Chalmers *tube-type* totally-enclosed fan-cooled motors, you can cut auxiliary drive costs three ways. The opportunity for low installation cost through outdoor applications is only the beginning. Low maintenance and peak reliability both pay worth-while dividends throughout the long life of these motors.

These savings can be yours because the *tube-type* air-to-air heat exchanger design of Allis-Chalmers TEFC motors offers these advantages:

Complete enclosure protects stator core and other electrical parts from dirt and corrosion — indoors or out — under the most severe ambient conditions.

Self-cleaning action results from generous flow of outside air through smooth, straight, heat-exchanger cooling tubes.

Full internal air circulation provides efficient, even cooling for long, trouble-free insulation life . . . and makes large ratings practical.

Available in sizes from 40 hp at 600 rpm to the largest required for power plant auxiliaries, this motor design has been proved in operation by hundreds of installations since 1946. For more information ask your A-C representative for Bulletins 51B7149 and 05B7150, or write to Allis-Chalmers, Milwaukee 1, Wisconsin. A-4258

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

The Rolling Schoolroom . . .

Your Kearney demonstrators are equipped with ALL Kearney tools to show your linemen how to work better, faster, SAFER.

THOMAS H. BOWEN

GEORGE E. LEWIS

ROBERT C. SMITH

ALVIN W. KOHLER

WAYNE M. PEDERSON

Your Crews will work Faster and Better

Is your load growth causing growing problems in line repair and maintenance? Modern loads may have outmoded your older hot line tools, causing your crews to work under unnecessary hazards and handicaps.

One way to be sure of getting the most from your maintenance crews is to equip them with modern KEARNEY Hi-Line Equipment . . . designed and tested to meet the need of modern energized lines. Kearney Hi-Line Tools are built by men who recognize that SAFETY IS FIRST in equipment of this kind and have let this philosophy guide their thinking as the pioneer manufacturers of hot line tools.

FOR COMPLETE INFORMATION

on how KEARNEY equipment can help you maintain uninterrupted service with the greatest safety and efficiency, write for your FREE copy of Bulletin 18.

20 TIME-SAVING TECHNIQUES

for making safe, efficient hot line replacements and repairs are described in this handy, pocket-size book for linemen. We'll be glad to send a FREE copy to each of your linemen. Simply mail us a list of their names.

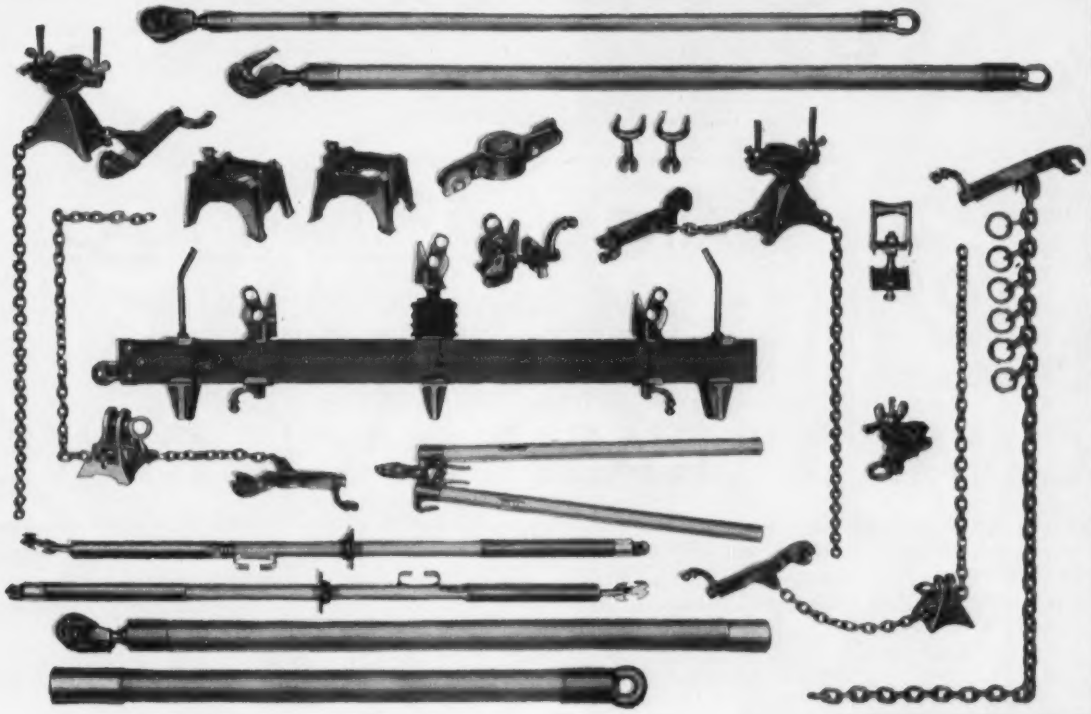
Specify KEARNEY

when they work Safely

with **KEARNEY**

Hi-LINE Tools

Designed to Fit Today's Heavier Loads...



Most hot line work involves replacing insulators, poles, crossarms, etc. For your convenience and economy, KEARNEY equipment has been grouped into sets for handling these jobs. Above is a Rural Line Set, specially designed to maintain rural lines safely and economically without service interruptions. Insulators, crossarms, poles and hardware on two, three and four conductor circuits can be replaced with this set. In addition, it is ideal to obtain the clearances required for maintaining transformers, cutouts, lightning arresters, as well as general inspection work. All wood units are tested to 75,000 volts for a period of five minutes.

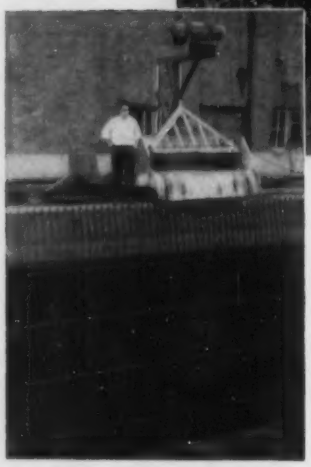
MAYDWELL & HARTZELL
INCORPORATED
WEST COAST DISTRIBUTORS
Los Angeles • San Francisco
Portland • Seattle
Spokane • Phoenix

JAMES R. KEARNEY CORPORATION
ST. LOUIS, MO.
GUELPH, ONT.

Products FOR BETTER CONSTRUCTION...
FOR SAFER MAINTENANCE

246

Left: Unretouched photograph of clogged intake at the Old Badger Plant, City of Kaukauna, Wisconsin (not mechanically cleaned). Compare this with the New Badger Plant (at left).



New Plant mentioned in which intake is cleaned with a Leonard trash rack rake. Both plants draw water from the same canal.

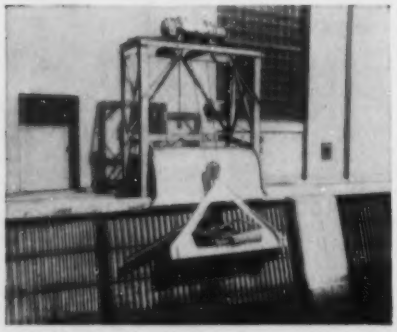
MAINTAIN *MAXIMUM HEAD*

SAVE POWER LOSSES AND OPERATING EXPENSES *with the*

LEONARD TRASH RACK RAKE

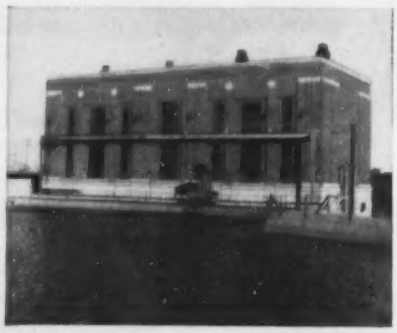
AT INTAKES TO HYDRO-ELECTRIC PLANTS, STEAM POWER PLANTS AND PUMPING STATIONS which removes leaves, river grass, lily pads, branches, logs, pulp wood, or other extraneous matter which gather on the racks to obstruct the water supply.

LEONARD raking equipment is specified by many of the country's leading Engineers, as well as public works agencies such as the U. S. Engineers, and Bureau of Reclamation. Write for our Bulletin 158 and list of installations.



Left: Leonard raking unit at the St. Mary's Falls Hydro-Electric plant; a U. S. Engineers project.

Right: View of forebay and power house at the Thilmany Plant, City of Kaukauna, Wisconsin. In addition to the Leonard rakes at this plant and the New Badger plant, the City also has one at its Little Chute plant.



POWER by SMITH — 16,000,000 HP

76 YEARS EXPERIENCE DESIGNING AND MANUFACTURING HYDRAULIC TURBINES AND ACCESSORY POWER PLANT AND PUMPING STATION EQUIPMENT

S. MORGAN SMITH CO. York, Penna., U.S.A.

General Electric announces
transformers, regulators, capacitors with

SUPER MELAGLYP

a new outdoor finish with up to 150% longer life

GENERAL ELECTRIC

for further details see next page ▶

New G-E Super Melaglyp finish adds years

POWER TRANSFORMER

While flat surfaces may be spray-painted, all tubular surfaces are flow-painted.

UNIT SUBSTATION

Substation

OIL FUSE CUTOUT

Conventional Unit-type

DISTRIBUTION TRANSFORMERS

VOLTAGE REGULATOR

# of extra protection to outdoor equipment

New finish averages 50% longer life than previous finish . . up to 150% longer in corrosive locations; saves money by cutting repainting costs

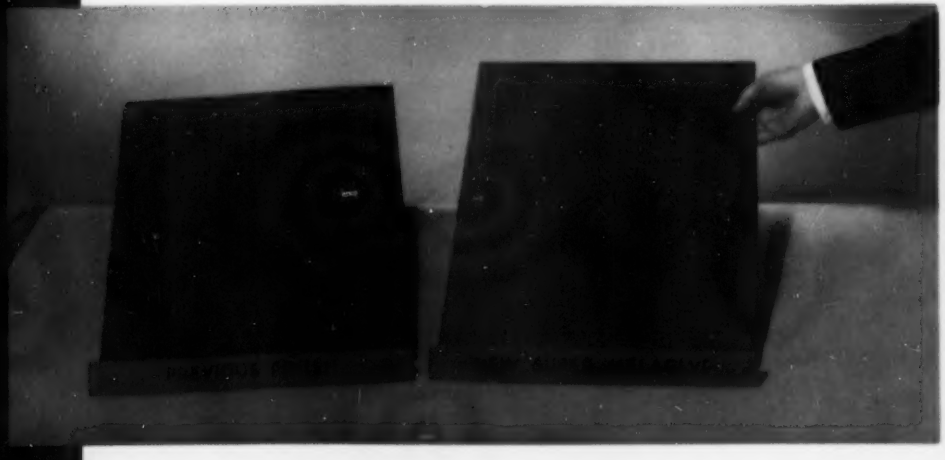
All of the General Electric distribution apparatus shown on these pages is now finished with Super Melaglyp, a new outdoor paint finish developed in G-E research laboratories. By actual tests, this new finish has an average life 50% longer than the previous finish used. This longer paint life means that you save one, perhaps two, repaintings. (At an average repainting cost, for example, of $15 per distribution transformer, that's real economy.)

WHERE PAINT LIFE COUNTS THE MOST — in areas where corrosive industrial "smog" and other chemical fumes literally eat an ordinary finish down to the base metal — Super Melaglyp will cut your repainting bill even more dramatically. Laboratory tests show that in such corrosive atmospheres *the new Super Melaglyp will give you up to 150% longer paint life than the best finish previously known to us.*

WE BELIEVE that Super Melaglyp is by far the best outdoor finish available today for distribution and power apparatus. It's another example of the extra values you get by specifying G-E equipment. General Electric Company, Schenectady 5, New York.

Progress is our most important product

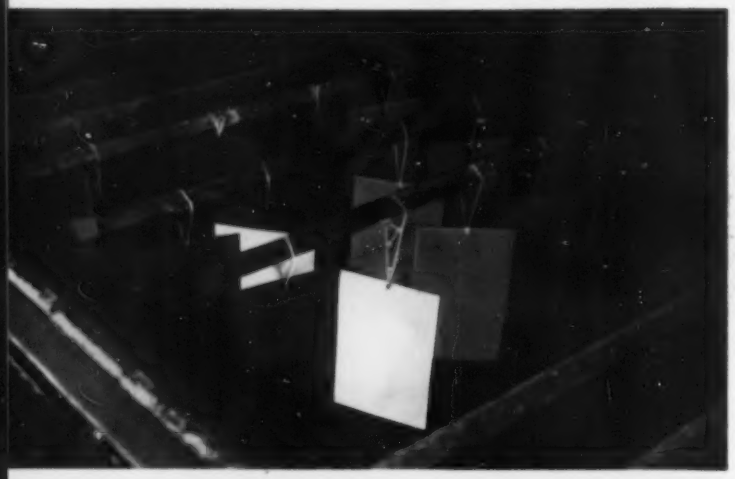
GENERAL ELECTRIC



SALT-SPRAY TEST PROVES SUPERIORITY OF NEW FINISH

After 855 hours in an accelerated salt-spray test, G.E.'s new Super Melaglyp (right) is just as good as new . . . although the previous finish (left) has started to show signs of weathering.

SUPER MELAGLYP—a product of G-E research—proved superior by 1400-hour salt-spray and 17,000-hour Weather-Ometer tests



Super Melaglyp was developed in General Electric research laboratories after more than 4 years of experimentation.

The upper picture shows panels painted with Super Melaglyp in the salt-spray "box" at G.E.'s Materials and Processes Laboratory in Pittsfield, Massachusetts. Super Melaglyp lasts for over 1,400 hours in this rugged accelerated test compared with an average life of only 700 hours for the best paint finish previously known to us. This indicates that Super Melaglyp has unusually long life in salt and corrosive atmospheres.

The lower picture shows several panels finished with Super Melaglyp in a "Weather-Ometer," which simulates natural weathering by alternately exposing the paint samples to ultra-violet light, water spray, and to heat and cold. Super Melaglyp passed this test with the highest rating ever given to any apparatus paint finish.

Below is a tabulation showing how Super Melaglyp stands up in a wide range of laboratory tests, and how it surpasses the best paint finish previously known to us. 431-13

Here's how new Super Melaglyp compares with previous finish

	Previous finish	New Super Melaglyp
Film Continuity	100%	200%
Color Retention	100%	150%
Gloss	100%	130%
Gloss Retention	100%	150%
Water Resistance	100%	250%
Humidity Resistance	100%	250%
Salt-Spray Resistance	100%	200%
Ultraviolet Resistance	100%	250%
Chemical Resistance	100%	175%
Abrasion Resistance	100%	100%
Oil Resistance	100%	100%
Appearance	100%	125%

Progress is our most important product

GENERAL ELECTRIC

MIKE THE MOLE SAYS:

Give the GUY a CHANCE

I get around . . . and I know that Chance Anchors really hold

YOU GET THE MOST FOR YOUR MONEY WITH CHANCE ANCHORS
the most complete line

8-WAY EXPANDING

The guy load is distributed all around the anchor—no wasted space between blades. Usually installed in clay or loam.

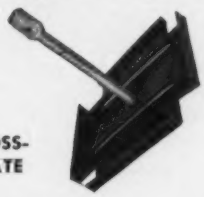
NO-WRENCH SCREW

For hand or machine installation. Pitch-controlled blade goes down faster and adds to holding power in sandy soil, soft clay or loam.

NEVER-CREEP

Made of structural steel. Pulls entirely against solid, undisturbed earth. For extra heavy loads in clay or loam.

CROSS-PLATE



For heavy-duty anchoring in machine-bored holes. Holds better than logs or slugs. Saves time and money.

SWAMP SCREW

For swamps, marshes, quicksand, river crossings or seasonally flooded areas. Screws down deeply by adding sections of pipe.

8-WAY CONE

Acts as inverted wedge. Flaring base and flat faces increase wedging action. Used in rocky areas with rock wedging.

EXPANDING ROCK

No grouting necessary. The greater the pull, the tighter it wedges against solid rock. Set in 2" drilled hole.

WRENCH TYPE SCREW

All steel—double arc welded. Anchor hub absorbs installation strain. For light loads in sandy soil, soft clay or loam.

POLE KEY ANCHOR

Keys poles at the butt to reinforce them against unbalanced loads in soft soil. Ideal for congested urban areas.

Both the soil type and condition are important factors in determining the type of installation and the kind of anchors to use. That's why Chance Anchors are made in so many types and sizes. The anchors shown above are made in a wide variety of sizes. Each type is designed for certain soil and guying conditions. Each of these anchors will do its specific job better than any other anchor you can choose.

Protect your investment in line construction. Analyze your soil and guying conditions, and specify the Chance Anchors that meet your particular requirements.

There is a CHANCE Anchor Distributor in your area who can probably fill your order directly from stock.
Specify* CHANCE *for Service!

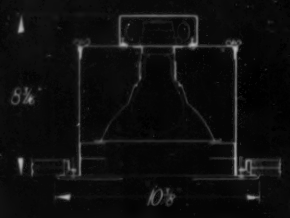
CA54-2A

ABC INDUSTRIES

A·B·CHANCE CO·
CENTRALIA, MISSOURI
SAN FRANCISCO, CALIFORNIA

SPOT
LIGHTING
WITH
CURTIS

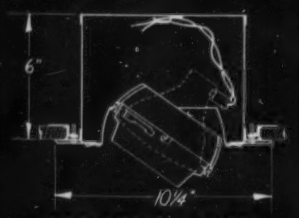
"VARI-SPOT"



CATALOG No. 2246

Curtis "Vari-Spot" is a shallow recessed downlight, utilizing one 100-watt inside frosted incandescent lamp. It is designed for use in residential and commercial interiors. An adjustable Alzak aluminum reflector permits the diameter of the circle of light to be controlled and changed as desired. Decorative holes in the finishing ring provide an attractive light pattern at the ceiling.

"PUNCHY"

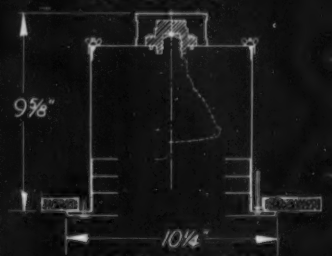


CATALOG No. 2240

Curtis "Punchy", is a shallow recessed adjustable downlight utilizing one PAR-38, Side Prong 150-watt projector spot or flood lamp. It is designed to provide punch lighting for counters, displays, show windows and other areas in store interiors.

"Punchy" features an exclusive aluminum gimbal ring which permits adjustment of the lamp to any angle 0° to 35° from the vertical, and 0° to 360° horizontal.

"SPOTTY"



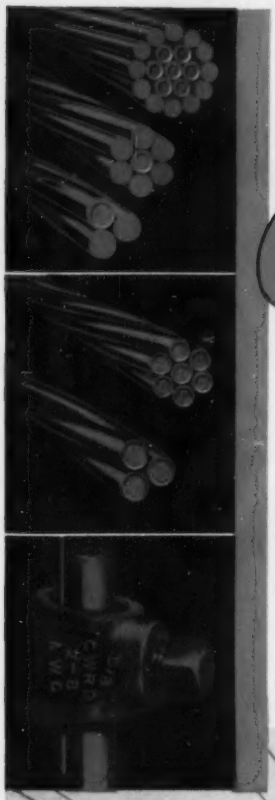
CATALOG No. 2244

Curtis "Spotty" is a shallow recessed fixed downlight utilizing either one PAR-38 or R-40 screw base 150-watt spot or flood lamp. It has wide application for accent, supplementary and general lighting.

Three horizontal steel baffles, an integral part of each unit, are designed and positioned to provide an exceptionally low-brightness incandescent unit at normal viewing angles.

WRITE FOR FREE DESCRIPTIVE LITERATURE

Curtis Lighting, Inc., 6135 W. 65th Street, Chicago 38, Illinois



CUT OVERHEAD EXPENSE ON YOUR OVERHEAD LINES WITH Copperweld

TRADE MARK

POWER CONDUCTORS

SHIELD WIRES

GUY AND MESSENGER STRAND

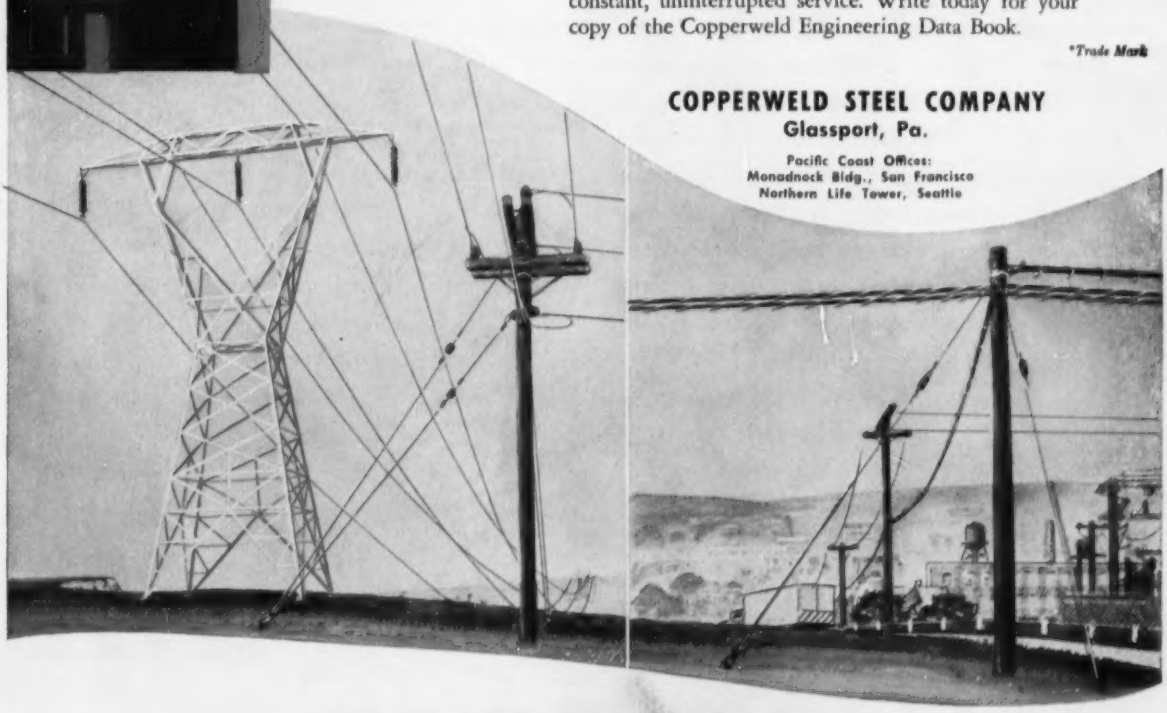
GROUND RODS AND CLAMPS

For over 38 years Copperweld* Products have provided dependable service to the Electrical Industry. Their trouble-free performance has been proved by time. Their lowest annual cost is a matter of record.

When you build with Copperweld Products, you get the long life and conductance of copper inseparably molten-welded to a core of high strength steel. And because Copperweld can't rust, this original high strength is retained for the life of the installation. This means your overhead lines will have the stamina to stand up under all types of operating conditions.

Profit by the experience of many of the world's leading power companies, railroads, and communication systems. Specify Copperweld Conductors, Shield Wires, Strand and Ground Rods for your overhead lines. There is no better way to keep the power load up, keep overhead down and be assured of constant, uninterrupted service. Write today for your copy of the Copperweld Engineering Data Book.

*Trade Mark



COPPERWELD STEEL COMPANY
Glassport, Pa.

Pacific Coast Offices:
Monadnock Bldg., San Francisco
Northern Life Tower, Seattle

Copperweld TRADE MARK **PRODUCTS**

Cost Less BECAUSE THEY *Last Longer*

HV Transmission Unlimited

Successful completion of a commercial type power transformer for a 600-kv transmission line gives the electric power industry a proved means for raising transmission voltages far beyond present levels.

New insulation techniques developed at Allis-Chalmers are primarily what made the new unit possible. In addition, a special experimental bushing had to be designed and built by A-C engineers. Other notable features include use of the tank for clamping core and coils, very low oil requirement, and light weight in proportion to kva capacity.

It is a two-winding unit rated 5000 kva, single-phase, low voltage 2400/4800 volts, high voltage 600,000 volts to neutral. It was given impulse tests of 1600 kv full wave, 1850 kv chopped wave. It has sufficient strength to permit operation on a 600-kv solidly grounded transmission line with lightning arresters now available — possibly on an 880-kv transmission line in the future. And, like all Allis-Chalmers power transformers, the unit is Corona-Free.

The construction of this transformer has produced useful design and manufacturing experience. It will result in concrete advantages to buyers of Allis-Chalmers power transformers in all voltages. A-4178

Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-

CHALMERS

A-C
ALLIS-CHALMERS

DELTA-STAR *High Capacity* MK-40 SWITCHES

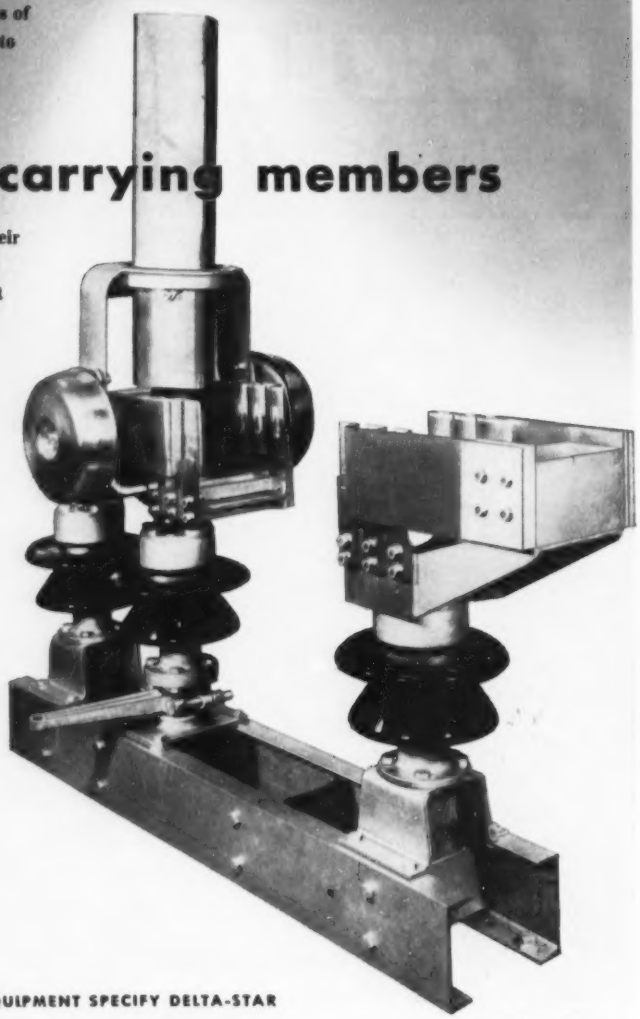
have straight line current path

Arrangement of silver-to-copper contacts at both ends of blade give a straight line current path from terminal to terminal. Identical contacts eliminate the need for cumbersome flexible shunts.

no cast current carrying members

All current carrying parts are hard drawn copper. Their large cross section and minimum number of current interchange surfaces provide a low resistance current path with ample material for heat dissipation.

Throughout the entire line from 7.5 KV to 69 KV and from 2000 amp. to 5000 amp. the same principal of blade mechanism is used. The fully controlled and counterbalanced blade is actuated by an enclosed ball bearing mechanism which rotates the blade about its axis and releases the high contact pressure before opening. Square tube blade automatically locks in both open and closed positions. The complete operation of opening or closing is under positive control during the complete cycle and is remarkably smooth and easy for switches of this size.



23 KV 4000 amp.
3-pole disconnecting switch

Delta-Star "MK-40" High Capacity group operated switches are available in ratings from 2000 to 5000 amperes; 7.5 to 69 KV inclusive for horizontal upright, underhung or vertical mounting.

Ask for Publication 4904

WHEN YOU WANT THE BEST IN HIGH VOLTAGE EQUIPMENT SPECIFY DELTA-STAR

DELTA-STAR ELECTRIC DIVISION

H. K. PORTER COMPANY, INC.
OF PITTSBURGH
2437 FULTON STREET, CHICAGO 12, ILLINOIS
DISTRICT OFFICES IN PRINCIPAL CITIES

EARTHQUAKES CAN'T SHAKE THIS SUNBEAM LUMINAIRE DOWN

Not that any building would remain standing after tilting 45° from the vertical, Sunbeam's new concentric louvered incandescent #EQ2500 fixtures would still hang safely in a vertical position. Under severe tests, no amount of vibration or rattling could cause the parts of this fixture to separate. Specially designed for school lighting, these units meet the requirements of the California State Division of Architecture for earthquake-proof construction. Low brightness within the shielded zone still surpasses the requirements of the American Standards Association for school lighting practices. Using silvered bowl lamps of 300W to 1500W, these fixtures contain only U. L. approved parts and the socket enclosure is finished in special high heat treated enamel. For schools, offices and stores requiring indirect, incandescent, low brightness lighting which must survive severe installation conditions, please inquire at your leading electrical distributor about Sunbeam's #EQ2535P and #EQ2575P pendant units.

SUNBEAM visionaire

SUNBEAM LIGHTING COMPANY, 777 E. 14TH PL., LOS ANGELES 21, CALIFORNIA

Let's face facts!

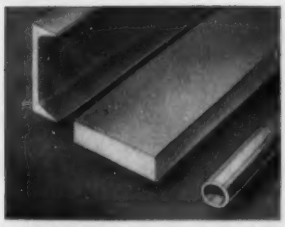
It's easier—and cheaper—to follow the leader than to pioneer products. Trail blazing of fittings for the electric light and power industry, for example, costs money. More money than many companies, eyeing their profit pictures, are willing to invest.

But, 55 years ago, when Alcoa started making aluminum accessories, there were none to copy. More than two million miles of transmission line depend on aluminum accessories today because of work we did. Thousands of heat runs at our research labs

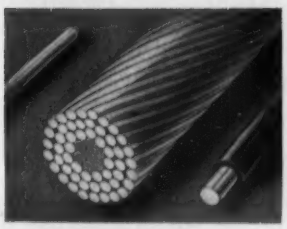
ALCOA ON TV brings the world to your armchair with "SEE IT NOW" featuring Edward R. Murrow, Tuesday evenings on most CBS-TV stations.

taught us the value of avoiding skimpy designs. Thousands of vibration tests at our physical testing labs taught us many basic design principles. Thousands of exposure tests on our own and customers' lines and at corrosion study centers taught us the importance of full recognition of the corrosion problem.

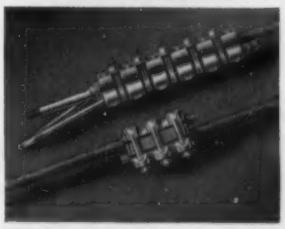
There is no substitute for Alcoa quality —you get just what you pay for. ALUMINUM COMPANY OF AMERICA, 2103-B Alcoa Building, Pittsburgh 19, Pennsylvania.



Alcoa® Aluminum Bus is available in rectangular and solid round bars, channels and tubular shapes.



Alcoa Aluminum Electrical Conductors include ACSR, solid and stranded aluminum wire, bare or covered.



Alcoa's full line of aluminum accessories is correctly designed for use with all aluminum conductors.

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA

the latest unit in a proven line of...

PHOTOELECTRIC CONTROLS for street lighting

The new improved F-P Control 63300C is the result of eight years of practical experience in photoelectric control for street lighting. Developed in conjunction with leading utility engineers, the new unit provides:

ACCESSIBILITY — The potentiometer is easily adjusted and the circuit fuse quickly changed without removing the meter glass. All major components are readily accessible.

SWITCHING CAPACITY — A SPDT double break power contactor is built into the control chassis. The normally closed contacts energize a lighting load at night up to 3000 watts. The normally open contacts energize a load during daytime up to 2000 watts. These ratings apply to incandescent, mercury or sodium vapor lamps.

PROTECTION — The F-P Series 63300C Control is conservatively rated 3000 volts RMS hipot between any part of the circuit and ground. In the event of functional failure of the circuit, the controlled lighting load will remain on.

HIGHEST QUALITY components are used throughout. All tubes are preaged and tested to give a nominal life of over 20,000 burning hours. All other components have much longer life. Fisher-Pierce Photoelectric Controls have been proven reliable by the experience of hundreds of utilities in thousands of installations.

METAL ENCASED CONDENSERS
CIRCUIT FUSE Easily checked
PHENOLIC SUBMOUNTING CHASSIS Maximum component protection
NEW PILOT RELAY Balanced armature construction
NEW POWER CONTACTOR Night load energized on normally closed contact.
POTENTIOMETER Readily accessible
CLEAN METER PLATE Nothing to interfere with external wiring

Write for Catalog.

The FISHER-PIERCE CO., Inc.

43 Pearl St., So. Braintree, Boston 85, Mass.

EXPORT: PHILIPS EXPORT CORP. 100 E. 42nd STREET NEW YORK 17, N.Y.

IN CANADA: NORTHERN ELECTRIC CO., Ltd.

LETTERS TO THE EDITOR

Let's Make Up Our Mind

To the Editor:

The letter from Charles L. Smith, secretary, National Electrical Code Committee, NFPA, that appeared on p 32, December 1953 edition, requested publicity that there was no conflict between Tables 1 and 2, Chapter 10, 1953 edition NEC, and Paragraph 2403 of the same edition.

He is correct—from the standpoint of one who is more interested in the letter than in the intent. The "ostrich"* clause that removes the conflict starts on the third line of Par. 2403-a:

"But in no case shall the size of rating of the fuse exceed 150% of the allowable current-carrying capacity of the conductor." (The sequence of fuses given in the last subparagraph of Par. 2403-a is such that no fuse has 1½ times the carrying capacity of its predecessor.)

However—and this is the critical point—Table 1 says 500,000-cir-mil type R has an *allowable* capacity of 320 amp while Par. 2403 permits it to be fused to 400 amp; 350,000-cir-mil type RH has an "allowable current-carrying capacity" of 310 amp but it may be fused to 400 amp, etc.

Table 1, Chap. 10 lists for type R only eight out of 28 sizes whose carrying capacities agree with the fuse ratings, and for type RH, only six out of 25 sizes agree with the fuse ratings.

If a 400-amp fuse is satisfactory for cable whose "allowable current-carrying capacity" is 310 amp, then a one-third increase in the carrying capacities of Table 1 should be completely satisfactory.

That is, let's be honest and make our current-carrying capacities and the fuse sizes agree.

Either it is hazardous to carry 400 amp on 500,000-cir-mil type R or else it is not.

If it is not hazardous, then Table 1 is false. If it be hazardous then Par. 2403-a is wrong. If Table 1 is true, then it is hazardous to carry 1½ times the current allowed by Table 1.

James Moore Evans, E.E., M.E.
Construction Management Engineer
Air Force Flight Test Center, EAFB
Edwards, Calif.

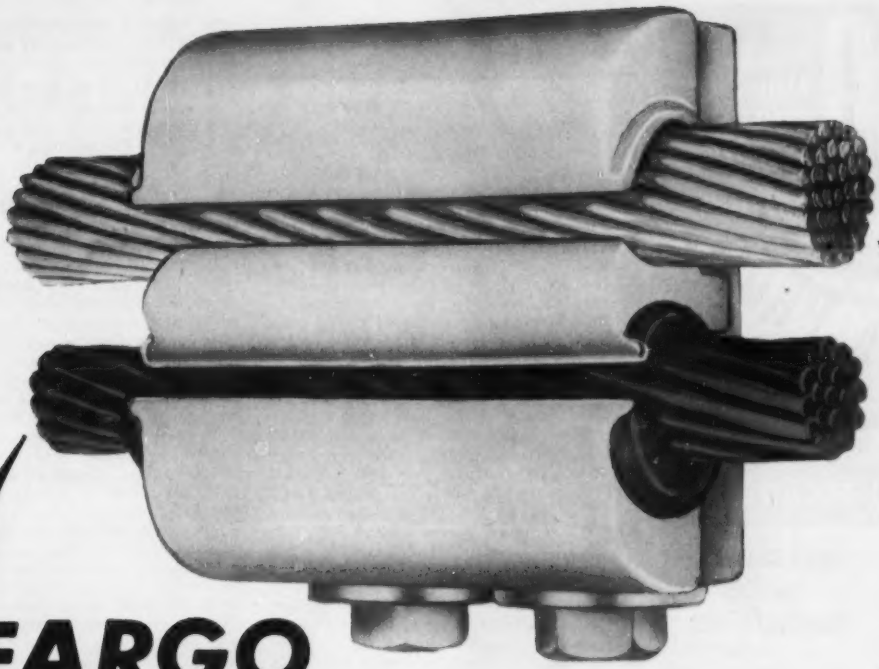
Distribution Economics

To the Editor:

I appreciate very much your thoughtfulness in sending me a copy of Walter Heston's editorial in the November issue of Electrical West on the subject of distribution economics. Walter has rendered a real service to the utility industry and certainly no one can quarrel with his logical presentation.

Inasmuch as we have no generating facilities, we have been able to concentrate upon distribution problems. When we began operations seven years ago, there was practically no 12-kv distribution in our 650-square-mile service area. For the past several years, we have had two heavy line

* Ostrich is a bird that is reputed to swallow anything.



FARGO HEAVY-DUTY, TWO BOLT CONNECTORS

ALUMINUM

●

ALUMINUM TO COPPER

●

COPPER

The wide curved jaws and spacer pad of Fargo Heavy Duty Connectors distribute the contact pressure over a large area, minimizing conductor distortion and "cold flow". Parabolic grooves give high electrical, as well as thermal conductivity between conductor and connector. Larger comparative mass and greater radiating surfaces result in better heat dissipation under normal and fault currents.

Clamps are designed to bring every conductor strand directly under a pressure area giving an even distribution of current through the cable at the joint. Adequate conductor separation is obtained with the thick spacer bar.

Like other Fargo Connectors they are of "one piece" construction with no loose parts to lose. They're "built like a vise . . . grip like a vise", and may be easily, quickly and safely installed.

●

Ask your Line Material Field Engineer to give you complete details.

FARGO

Manufactured by

FARGO MFG. COMPANY, INC.

Poughkeepsie, N.Y.

Distributed by

LINE MATERIAL COMPANY

(A McGraw Electric Company Division)

Milwaukee, Wisconsin

LM

OHIO MOTOR AND GENERATOR BRUSHES

SHOW A PROFIT

FOR YOU BECAUSE...

THEY DELIVER PROPER COMMUTATION

They are expertly designed to meet the most exacting customer requirements and conditions in the field. Good engineering results in proper COMMUTATION, which is definitely the most important function of a motor brush. Conditions encountered below earth-level, at earth level or in the stratosphere will affect proper commutation. Location, humidity, temperature, dust and fume conditions, over-load, under-load are as important as the motor itself. *Identical motors and generators often do not give identical performance.*

Address your COMMUTATION PROBLEMS to our engineering staff

ORDER YOUR CARBON BRUSHES FROM A SINGLE SOURCE

West Coast Representative
C. F. BOWERS
544 S. San Pedro St.
Los Angeles 13, Cal.

THE OHIO CARBON COMPANY
12508 BEREA ROAD • CLEVELAND 11, OHIO

LETTERS

Starts on Page 30

crews spending full time on converting from 4 kv to 12 kv in our rural areas and we have made substantial progress in this conversion program. Our 1954 budget makes provision for a continuance of this program.

In 1947 our winter peak demand was 76,857 kw and it will be approximately double this figure for the current month. Additional substation capacity to meet such increased demands on our system has been accomplished almost entirely by adding modern unit substations with automatic voltage regulation. We are very much aware of the fact that low-voltage conditions have a direct effect on our revenues quite aside from creating customer dissatisfaction. Incidentally, you will probably be interested in knowing that system losses in 1947 exceeded 11% and our current annual loss figure is now around 9%.

Our bulk power contract with PG and E provides that we get a discount of .2% on our power bill for each 1% that average power factor exceeds 85%. In the month of November we had a power factor of 96%, which gave us a 2.2% discount on a power bill of approximately $350,000. We have an investment of about $125,000 in capacitors and you can see from the discount figure mentioned that we know our capacitor investment is paying off handsomely.

Our engineering department has established standards for the loading of distribution transformers so that transformer sizing is not left to field-construction personnel. Mention of our engineering department reminds me that I feel we are particularly fortunate in having obtained a competent engineer like Paul Shaad to serve as chief electrical engineer. He has developed a small staff of up-and-coming young engineers who have no preconceived ideas and who are very alert to new advances in the electrical engineering field. While I know that they are not doing a perfect job, I feel confident that it is well above average.

I am glad you wrote me because it gave me a chance to take another look at one aspect of our operations and could see some tangible measures of the progress we have made in the past seven years. By the same token, I am sure that we can achieve still further economies by continuing attention to distribution problems.

James E. McCaffrey
General Manager & Chief Engineer
Sacramento Municipal Utility District
Sacramento, Calif.

More Facts; Less Drama

To the Editor:

I dislike to take an "anti" attitude with relation to someone's honest attempt to point out what he feels is an important matter but, on the other hand, it is impossible in this case to pat him on the back for anything more than a conscientious desire to cover a subject that seems to be a little too big for him. I have the following critical comments to make:

1. In his first paragraph, Mr. Heston makes the statement that "Engineers who design power plants frequently spend a half million to a million dollars to gain 1% in efficiency." This is, of course, true but he fails to call attention to the fact that the million-dollar expenditure for such a purpose is only justified in a hydro development where the project costs run close to $90,000,000. Since the over-all efficiency of a hydro plant is about 88%, to gain 1% efficiency and keep your costs from rising, the increased costs must not be more than 1/88 part of the original total.

Mr. Heston was conservative in his figure of four mills per kwh for energy cost at the power plant.

2. As to the matter of increasing distribution efficiency, Mr. Heston emphasizes a subject which our distribution engineers are considering and battling with daily as changes and improvements become necessary.

It is just as important that our engineers do not go overboard and spend too much money, which must be earned on indefinitely, as that they underrate a job and lose in lower efficiency. It has been my teaching to our men, with only partial success, that it is better to have a load outgrow their reasonable estimate, and therefore find a few jobs requiring rebuild somewhat sooner than anticipated, than it is to overspend on all jobs to be certain they shall never be caught with insufficient capacity. In other words, I feel it should be a pleasant experience to occasionally have loads grow faster than their reason-

Use this coupon if: (1) you have a problem; (2) want to ask a question; (3) want to comment on any department in the magazine; (4) have a "gripe."

Dear Editor:

_____

_____

_____

_____

_____

_____

_____

NAME ..... TITLE .....

ADDRESS .....

COMPANY .....

CITY ..... STATE .....

Can't rust out! no cracks or crevices . . . no place for rust to get a foothold . . . seamless, one-piece housing with unbroken surface of "Life-Time" Porcelain Enamel!

No service breaks due to humidity!

poor lamp-starting eliminated . . . electric contacts protected from corrosion . . . light-reducing dirt sealed out

Benjamin "Vapor-Tite" Units make it possible to provide modern fluorescent lighting for locations with moisture-laden atmospheres. They are specifically built to combat the corrosive effects of such humid workplaces as textile mills, laundries, bottling plants, food processing operations, etc. A solid armor of porcelain enamel defies humidity, steam, dirt and vapors. This is the "Life-Time" surface that cannot wear, scratch, become dull, deteriorate or corrode because it is literally "glass fused to steel".

In addition to the humidity-defying features described above, this unit is equipped with the patented Benjamin "Springlox" Lampholder... famous for "easy-in, easy-out" lamp servicing and completely safe operation in humid atmospheres. After 1,000 hours in 95% humidity at 95° F., and after 400 hrs., under a continuous salt spray, "Springlox" was still in operation! Get up-to-date information on fluorescent lighting that defies humidity... ask for Bulletin VT. Benjamin Electric Mfg. Co., Dept. J, Des Plaines, Ill.

TH-261

available with this exclusive **Benjamin "Springlox" Lampholder** for two or three 40" bi-pin or single-pin fluorescent lamps.

BENJAMIN

"VAPOR-TITE"

Sold exclusively through electrical distributors

A Product of Benjamin Electric Mfg. Co., makers of famous Benjamin and Leader Line Lighting Equipment and Sound Signals for Industry, Institutions and Commerce.

MAYDWELL & HARTZELL
INCORPORATED

Engineers and Factory Distributors

ELECTRICAL
Transmission
Distribution
Communication
EQUIPMENT

SALES OFFICES AND WAREHOUSES

158 ELEVENTH STREET
SAN FRANCISCO 3
HEmlock 1-1630

427 W. FIFTH STREET
LOS ANGELES 13
MUtual 7245

1238 N.W. GLISAN STREET
PORTLAND 9
ATwater 4173

306 DEXTER AVENUE
SEATTLE 9
SEneca 2368

RESIDENT SALES OFFICES

SPOKANE 8, WASH.
814 PAULSEN BUILDING
Main 5235

PHOENIX, ARIZ.
324 S. SECOND AVE.
Alpine 3-9595

MAYDWELL & HARTZELL
INCORPORATED

LETTERS

Starts on Page 30

able estimate had planned them to grow.

3. In Mr. Heston's example, where he makes a return adequate to justify a $400,000 investment when he increases sales 50c per year to 100,000 customers, he fails to recognize that this will probably call for a system serving over a million customers, for it is probably safe to say that the conditions making such a saving possible do not apply to more than 10% of the customers of any system. Mr. Heston apparently applies it to 100% of the customers in his example of 20 customers per transformer.

I give Mr. Heston credit for a thought-provoking editorial but it is something our distribution engineers are working on every day. I feel that when the editorial is corrected to make it more factual it will create much less interest.

B. C. Russell
Vice-president and General Superintendent
Idaho Power Co.
Boise, Idaho

"Subsidized" Power?

To the Editor:

Referring to your December editorial "Hells Canyon Won't Go to Hell," you are writing about "subsidized" federal power. I wonder if you understand the meaning of the word subsidized?

During the recent world war a device was invented known as "Fast Tax Write-off." This device was originated as a means of compensating investors to build needed war production facilities, which would be obsolete or without commercial value after the war. Through the use of the fast tax write-off, over a few years the government reimbursed industries for their investment in war production facilities.

The Idaho Power Co. wants to build a low dam in Hells Canyon. This dam and its power plant will not become obsolete and useless within a couple of years after completion. It will be used for years and years to come. It will not contribute to the defense effort, such as aluminum production, because the rates charged will be prohibitive for that purpose. The Idaho Power Co. publicly says, "There is no power shortage in Idaho," and one doesn't have to look twice at the rates to know the reason why.

Yet before the Idaho Power Co. has a permit to build this dam, it has already applied for a fast tax write-off and the government will be asked to use tax money to reimburse the Idaho Power Co. for the money it invests in the dam. As an engineer, I say this is subsidized private power from which the rate payers will get absolutely no benefit. The rate payer derives considerable benefit from investment of tax dollars in a federal power project, while at the same time contributing to the development of the nation's resources. The only reason for construction of the low dam in Hells Canyon is to prevent the public from putting a much larger multipurpose water resource development. Your pro-big business editorials against the public interest are going to result in many subscriptions to your magazine not being renewed.

Robert J. Thomas
3122 N.E. 47th
Portland, Ore.

IMPORTANT NEWS FOR USERS OF G&W TYPE "RA" LOAD BREAK OIL SWITCHES

Installation and maintenance instructions now available in a single bulletin!

You'll call G&W's new Bulletin DD53 the handiest book in your reference file. This 12-page bulletin contains complete information on the construction details of the various forms of Type "RA" oil switches. It explains why you are getting so many years of trouble-free service with your "RA" oil switches. It shows why you can use them with confidence for load break sectionalizing in your underground and overhead distribution system.

Bulletin DD53 provides in a single source all the information you need to assure proper installation, trouble-free performance and long life for your Type "RA" switches. Send for your copy of this comprehensive service bulletin today.

Send for your copy of New Bulletin on "RA" Oil Switches

D541

G & W Electric Specialty Co.
7780 Dante Ave., Chicago 19, Ill. Date_____

Please send me a copy of new Bulletin DD53—Type "RA" OIL SWITCHES—
Send _____ extra copies for other men here.

Name_____ Title_____

Company_____

Number, Street or P.O. Box_____

City_____ Zone_____ State_____

Specify Flexible Bronco 40!
You know exactly what you get. Its value is vulcanized into the jacket.
BRONCO 40
BRONCO 40 RUBBER TYPE S 2 COND #16 600V—40% RUBBER BY WEIGHT
now made with a
40% by weight
RUBBER JACKET
and is so branded!
the only 40% rubber-jacketed portable cord with branded jacket. Self-measuring, too—branding is repeated every 2 feet!
BRONCO 40 is recommended for inside, non-oily locations. Where severe conditions are encountered and maximum protection is required, the cord and cable to specify is BRONCO 60 CERTIFIED with 60% by weight Neoprene branded jacket.
SOLD NATIONALLY BY ELECTRICAL WHOLESALE DISTRIBUTORS
Manufactured by WESTERN INSULATED WIRE CO., Los Angeles 58 • California

ELECTRICAL BOOKS

DIRECT-CURRENT CIRCUITS, *by Earle M. Morecock, second edition, 388 pages, 6x9, McGraw-Hill Book Co. Inc., $5.*

This new edition of the book on electricity, including theory, practical examples, questions and problems, was prepared for use in technical institutes, for industrial courses and home study. Changes made include: use of the meter, kilogram and second rationalized system; emphasis on communication aspects of electricity; figures redrawn; magnetism and electromagnetism treated in descriptive nonmathematical manner; new questions and problems correlated with instructional examples.

TELEVISION RECEIVER DESIGN, FLYWHEEL SYNCHRONIZATION OF SAW-TOOTH GENERATION, No. VIII-B, *by P. A. Neeteson, 156 pages, 6x9, Elsevier Press Inc.—U. S. distributors, $4.50.*

This is the second book in a series of monographs on television receiver design by specialists of the Philips Research Laboratories. It gives an analysis of the flywheel action of resonant circuits, a study of automatic phase control and discussion of practical flywheel circuits for TV receivers.

ELEMENTS OF ELECTRICAL ENGINEERING, *sixth edition, by Arthur L. Cook and Clifford C. Carr, 682 pages, 6x9, John Wiley & Sons Inc., $6.75.*

Much of the text has been rewritten because of the great advancements in the electrical engineering field since the first edition was printed. Changes were based on the results of a nation-wide survey. While still emphasizing basic principles, more space is devoted to electronics, for a better balance between circuits, machines and electronics. New illustrations have been added and new problems formulated to illustrate basic principles.

HIGHER TRANSCENDENTAL FUNCTIONS, *volume 2, Bateman Project Staff, 396 pages, 6x9, McGraw-Hill Book Co. Inc., $7.50.*

The second of a three-volume work of reference on advanced mathematics, it is useful in many fields of engineering, physics and mathematics. It was compiled under the editorial direction of A. Erdélyi at the California Institute of Technology, based on the notes left by the late Prof. Harry Bateman. This volume contains chapters on Bessel functions and related functions, error functions, exponential, sine, cosine integrals and related functions, parabolic cylinder functions, orthogonal polynomials, elliptic functions and integrals.

INTRODUCTORY CIRCUIT THEORY, *by Ernst A. Guillemin, 550 pages, 6x9, John Wiley & Sons Inc., $8.50.*

This is an introductory treatment of the basic principles and concepts needed for complete understanding of advanced work in network analysis and synthesis. It is planned for those who have a continued interest in any area in which electric circuits play a part. The book begins with first principles, then goes into an exposition of the methods of steady-state and transient circuit analysis, giving basic concepts essential to synthesis procedures.

You wouldn't buy a suit of clothes from a picture or a catalogue. You *look* at the material... *feel* the quality...

This man is *feeling* the better value in a Day-Brite LUVEX® lighting fixture. There's no other way he can *know* how much extra strength, what greater ease of installation he'll get with LUVEX interlocked louvers—just one of many LUVEX features.

HOW TO PROTECT YOURSELF

when you buy and install lighting fixtures

Buy lighting fixtures like you buy a suit of clothes. Look at them yourself . . . *feel* the value . . . *feel* the quality . . . *feel* the difference you can't always find in the catalogues.

Pictures, catalogs and sales stories are excellent ways to bring competitive lines of lighting fixtures to your attention.

But when you're ready to buy for a lighting job, *don't make a decision until you handle the fixtures yourself.* Don't buy until you're satisfied by your own inspection which fixture is *your* best profit producer.

We expect you to test the LUVEX or any other Day-Brite fixture in exactly that way. We know from experience your own judgment is the very best Day-Brite sales story we have.

411

LOOK AT THE LUVEX®
... FEEL THE DIFFERENCE
... BEFORE YOU BUY!

"DECIDEDLY BETTER"
DAY-BRITE
Lighting Fixtures

Day-Brite Lighting, Inc., 5412 Bulwer Ave., St. Louis 7, Missouri.
In Canada: Amalgamated Electric Corp., Ltd., Toronto 6, Ontario.

YOU'LL FIND THE DAY-BRITE REPRESENTATIVE IN YOUR AREA HELPFUL AND COOPERATIVE

REGIONAL SALES OFFICE
Matt Cabot
3718 Alameda de los Pulgas
San Mateo, California

NEW MEXICO, ALBUQUERQUE
Alan Humphrey
1417 S. E. Princeton

COLORADO, DENVER 2
C. D. Belt & Co.
1921 Blake St.

CALIFORNIA, LOS ANGELES 12
H. R. Chilton
Day-Brite Ltg., Inc.
257 S. Spring St.

ARIZONA, PHOENIX
R. E. Tweedy
P. O. Box 6313

OREGON, PORTLAND 8
R. M. Camnitz
P. O. Box 4166

UTAH, SALT LAKE CITY
Stevens Sales Co.
P. O. Box 2338

CALIFORNIA, SAN FRANCISCO 3
J. H. Brundage
288 Seventh St.

CALIFORNIA, SAN DIEGO 1
Ed. L. Peterson Company
709 Bank of Am. Bldg.

LOCKE announces advance in

MICRO SUSPENSION

Now the originators of Compression Glaze give you MICROGLAZE SUSPENSION INSULATORS . . . made possible by new Locke discoveries ... the all-important porcelain glazing process.

A porcelain insulator's ability to resist impact varies with glaze thickness. Too much glaze . . . or too little . . . will not let the porcelain develop its full potential strength. On MICROGLAZE Insulators, glaze thickness is held within what Locke research has proved to be a *Range of Peak Strength* where resistance to mechanical impact is greatest.

This means that when you order MICROGLAZE SUSPENSION INSULATORS, whether by hundreds or thousands, you can be sure of uniform glaze thickness throughout . . . plus smooth appearance and peak strength.

So let Locke MICROGLAZE Insulators help you fight mechanical impact. No extra cost . . . *but you get so much more for your insulator dollar!*

Suspension Insulator Engineering

GLAZE*
INSULATORS

Write today for new 8-page folder titled "The Story of Microglaze Insulators"

LOCKE

LOCKE DEPARTMENT
GENERAL ELECTRIC COMPANY
BALTIMORE, MARYLAND

*Trademark of General Electric Company

Prepared for trouble?

You don't have to be armed to the teeth to avoid communications trouble. Not when your communications are supplied by the Bell System.

A planned program of preventive maintenance is an important part of Bell System service. Its purpose is to prevent interruptions in service.

In the laboratory, technicians are continually developing new and more efficient equipment. In the field, Long Lines plant and commercial experts frequently visit critical points of your communications system to observe conditions and to improve operations.

Alternate routings are an integral part of planning by telephone engineers to protect your service.

The entire program is backed by the Bell System's 78 years of communications experience.

We supply the power industry with reliable private-line telephone, mobile telephone and teletypewriter service, and channels for remote metering and supervisory control.

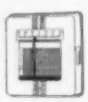
• • •

Your Bell Telephone Company will be glad to study your communications problems and needs.

PRIVATE-LINE TELEPHONE

TELETYPEWRITER

MOBILE TELEPHONE


METERING CHANNELS

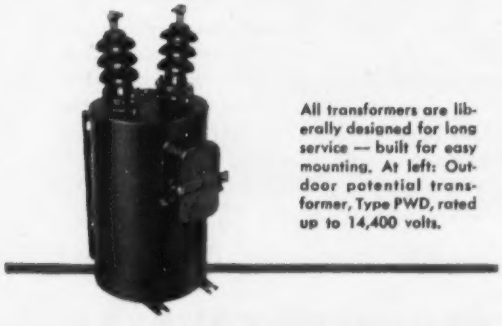
BELL TELEPHONE SYSTEM

400 RATINGS Fit Most Design Needs

ALLIS-CHALMERS
INSTRUMENT TRANSFORMERS

All Allis-Chalmers instrument transformers are designed to meet ASA standards. At left: Outdoor current transformer, Type KO, rated up to 15 kv, 800 amp.

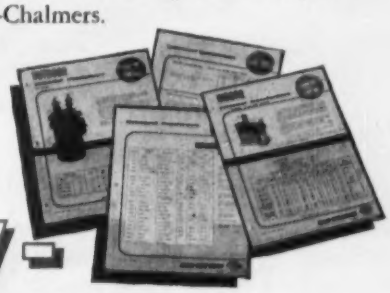
Thousands of these units are now in use with excellent operating records. At left: Indoor potential transformer, Type PD, fused or unfused, rated up to 14,400 volts.



All transformers are liberally designed for long service — built for easy mounting. At left: Outdoor potential transformer, Type PWD, rated up to 14,400 volts.

VIRTUALLY *every* instrument transformer requirement can be met from Allis-Chalmers 400 ratings of current or potential transformers or metering outfits. You can select dry-type, oil- or compound-filled units, depending on transformer rating, application, and location outdoors or indoors.

Every unit has the best combination of engineering and materials that 50 years of experience can provide. For top quality, wide selection, and quick delivery, it pays to specify Allis-Chalmers.



NEW—

Dimension Sheets Give Complete Details

Just off the press: all the mechanical and electrical information you need in a convenient, complete bound set of data sheets. Gives more detailed presentation of Allis-Chalmers complete line of standard instrument transformers than ever before. For your copy, contact your nearby Allis-Chalmers district office or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4065

ALLIS-CHALMERS

AC ALLIS-CHALMERS

This $11.00 worth of preformed splice rods saved $2000.00 for Louisiana Power & Light

WHERE: At 450-foot, West-Bank Tower of 3950-foot Mississippi River crossing of Louisiana Power & Light Company.

CAUSE OF DAMAGE: Flash storm loosened wire rope used for holding painting rigging. Rope lashed around energized lower phase wire of downstream circuit.

DAMAGE: Five outer strands of aluminum and five inner strands of steel were burned completely in two, reducing or impairing the tensile strength by an estimated 10,000#.

REPLACEMENT of the 3,950-ft. conductor span would have cost about $1,500 (not including labor) and necessitated an outage of at least 24 hours ($7,680 revenue at 4-mill rate).*

THE ANSWER: At the request of W. L. "Bo" Rush, Transmission Engineer of Louisiana Power & Light Company, Preformed Line Products Company designed and delivered a set of Preformed Splice Rods. How they were installed is shown on the opposite page.

This is just another example of how PLP PROGRESSIVE IDEAS . . . backed by a combination of research, engineering, operations and sales service . . . insure the ultimate in FIELD PERFORMANCE.

*From W. L. Rush article "115-KV Conductor Repaired in 14 Min." Ask for a copy of it.

PLP

PREFORMED LINE PRODUCTS COMPANY

5349 ST. CLAIR AVENUE • CLEVELAND 3, OHIO

TELEPHONE: CLEVELAND EXpress 1-3571

The Times-Picayune—New Orleans States

After getting in position, Paul Matthews, Contractor, and his assistant, Jack Turner, spent 10 minutes cleaning the conductor to be covered. Then they wrapped the 10½-foot Preformed Splice Rods, around the conductor, two at a time. They used only their hands, *no tools.* In just 14 minutes, the wrapping was complete. The entire job, including hauling equipment up and down the tower and rigging the bosun's chairs, took less than two hours.

SALES REPRESENTATIVES:

C. B. Anderson Co., *Tulsa* ● **Bergstrom-Verberg Co.,** *Minneapolis* ● **Vincent J. Brown Co.,** *Buffalo* ● **Burns Electric Co.,** *Pittsburgh* ● **Earl S. Condon Co.,** *Los Angeles* ● **Cory and Crum,** *Indianapolis* ● **The Electrical Distributors Co.,** *Philadelphia* ● **Engineer Sales Co.,** *St. Petersburg* **JSG Electric Co.,** *Chicago* ● **E. L. Flowers,** *Boston* ● **George R. Horne & Co.,** *Dearborn* ● **Johnson Sales Co.,** *Bay City* ● **H. L. Macon & Co.,** *Atlanta,* **Peterson Co.,** *Denver* ● **Elgin B. Robertson, Inc.,** *Dallas* ● **Elgin B. Robertson Co.,** *Houston* ● **K. M. Ryals Co.,** *San Francisco* ● **Shaffer and Nelson,** *Portland, Seattle, Spokane* ● **M. H. Snyder & Sons,** *New York* ● **Curtis H. Stout,** *Little Rock, Memphis, New Orleans* ● **L. G. Wendegatz,** *Kansas City*

Rigid testing of *Explosion-Proof* CONDULETS*

assures safety and long dependable service

Crouse-Hinds extensive laboratories and modern manufacturing combine to give you top quality

Laboratory testing is one of the key operations in the production of electrical equipment of the highest quality. Crouse-Hinds laboratories are equipped with the latest scientific instruments and staffed with expert technicians.

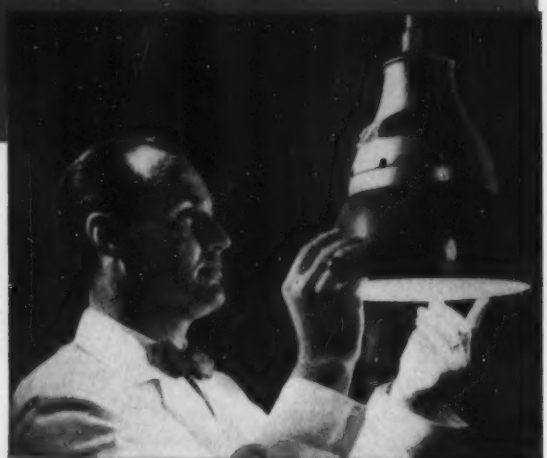
Products are constantly tested to make sure that they are being made to withstand field conditions. New devices are tested to predetermine their meeting or surpassing the requirements of Underwriters' Laboratories.

The photographs at the right show three of the many testing operations that are done in the Electrical Laboratory. It is equipped with apparatus for making both alternating and direct current tests, heat tests, pressure tests and many others.

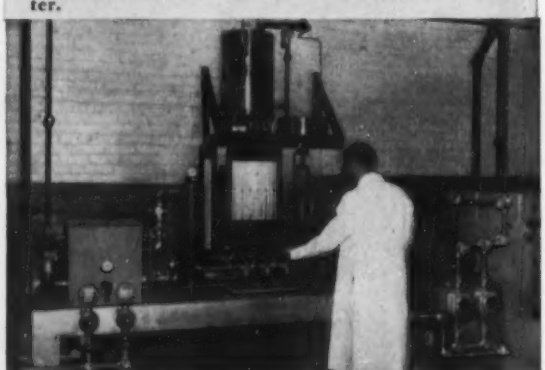
Close cooperation between Crouse-Hinds laboratories and manufacturing departments is one of the reasons why Condulets have been the "Standard of Quality" for nearly fifty years.

Specify CONDULETS on every job. They're made right... to serve you better... and last longer.

When quality counts
... you can count on Condulets



Probing for maximum exterior operating temperature on a Type EVA Explosion-Proof Lighting Fixture using a multiple point recording potentiometer.



Adjusting carburetors and flow meters to create a predetermined explosive mixture within an explosion-proof Condulet for an explosion test.

Photographing the pressure wave in the Oscilloscope to determine the maximum explosion pressure within an explosion-proof Condulet that is behind the concrete wall.

CROUSE-HINDS COMPANY
Syracuse 1, N. Y.

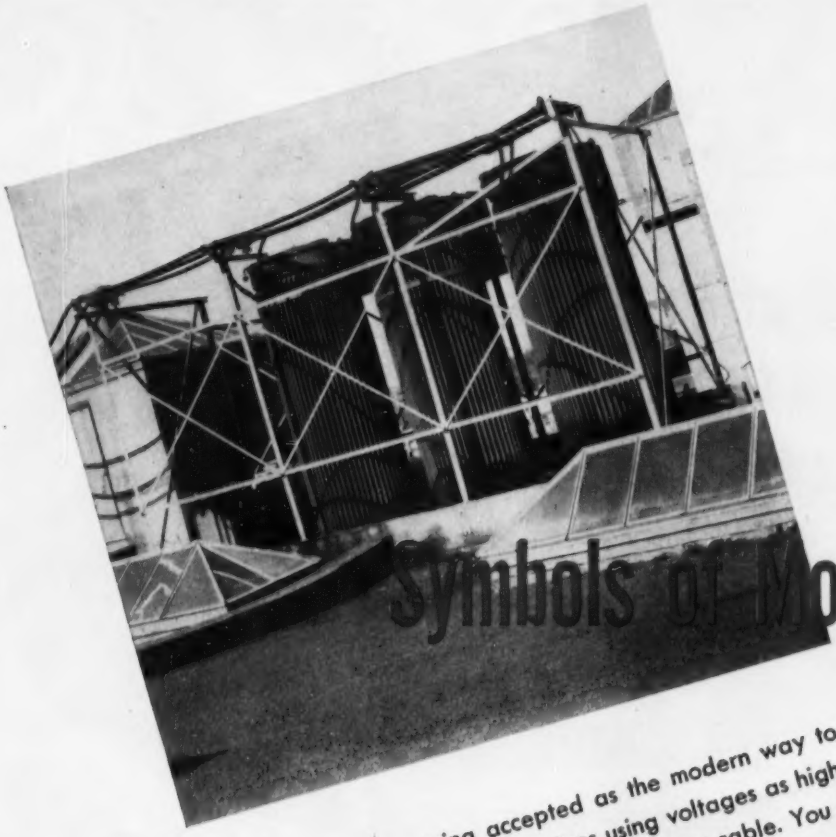
OFFICES: Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland — Dallas — Denver
Detroit — Houston — Indianapolis — Kansas City — Los Angeles — Milwaukee — New Orleans
New York — Philadelphia — Pittsburgh — Portland, Ore. — San Francisco — Seattle — St. Louis — St. Paul
Tulsa — Washington. RESIDENT REPRESENTATIVES: Albany — Atlanta — Baltimore — Charlotte
Corpus Christi — Reading, Pa. — Richmond, Va. — Shreveport
Crouse-Hinds Company of Canada, Ltd., Toronto, Ont.

CONDULET — First in the field — STANDARD OF QUALITY

*CONDULETS are made only by CROUSE-HINDS

A Nationwide Distribution Through Electrical Distributors

CONDULETS · TRAFFIC SIGNALS · AIRPORT LIGHTING · FLOODLIGHTS



Symbols of Modernization

Unit load centers are rapidly becoming accepted as the modern way to distribute power inside an industrial plant. This frequently involves using voltages as high as 17,000 volts. That's too high a voltage to be trusted to just any ordinary cable. You can't afford mediocrity in these important cables. Simplex-ANHYDREX XX should be your choice.

Simplex-ANHYDREX XX is a product of Simplex research and development. It is an insulation that is absolutely "tops" in the high voltage field. It is designed to operate at a maximum of 176°F. (80°C.) copper temperature.

Simplex-ANHYDREX XX has all the properties you want in a high voltage rubber insulation. It withstands heat, ozone and aging, and it is guaranteed not to absorb more than 15 milligrams of water per square inch of exposed surface when tested in accordance with U. S. Coast Guard standards.

So far as we know it is the only insulation of its kind. Use it wherever you have a high voltage problem, whether the cables are to be installed directly in the earth, underground in ducts, underwater, or overhead supported from messenger wire.

Simplex-ANHYDREX XX Cables are available in single and multiconductor styles for voltages from 2,000 to 17,000 V.W.P.

Simplex

SIMPLEX WIRE & CABLE COMPANY, 79 Sidney St., Cambridge 39, Mass.

You a target?

Let's face it . . . we're all targets!

If your plant is not ready with a disaster plan, better act now. There's not a single American plant that's out of range of an intercontinental bomber—and fires, floods, tornadoes or explosions can kill you just as dead as an atom bomb.

It costs next to nothing to take a few simple steps which may save hundreds of lives. Here they are. Check them off today.

☐ **Call your local** Civil Defense Director. He'll help you set up a plan for your offices and plant—a plan that's safer, because it's integrated with community Civil Defense action.

☐ **Check contents** and locations of first-aid kits. Be sure they're adequate and up to date. Here, again, your CD Director can help. He'll advise you on supplies needed for injuries due to blast, radiation, etc.

☐ **Encourage personnel** to attend Red Cross First-Aid Training Courses. They may save your life.

☐ **Encourage your staff** and your community to have their homes prepared. Run ads in your plant paper, in local newspapers, over TV and radio, on bulletin boards. Your CD Director can show you ads that you can sponsor locally. Set the standard of preparedness in your plant city. There's no better way of building prestige and good community relations—and no greater way of helping America.

Act now . . . check off these four simple points . . . lives are at stake . . . have you a right to delay?

ELECTRICAL WEST

out of this high-voltage laboratory comes

... THE MOST SIGNIFICANT ADVANCE IN LIGHTNING ARRESTERS SINCE THYRITE!

Revolutionary in design—developed and laboratory tested by General Electric engineers, then thoroughly field tested—the new **THYRITE* MAGNE-VALVE** station arrester establishes a *new high in over-all protective efficiency and endurance for protection of generating and substation apparatus.*

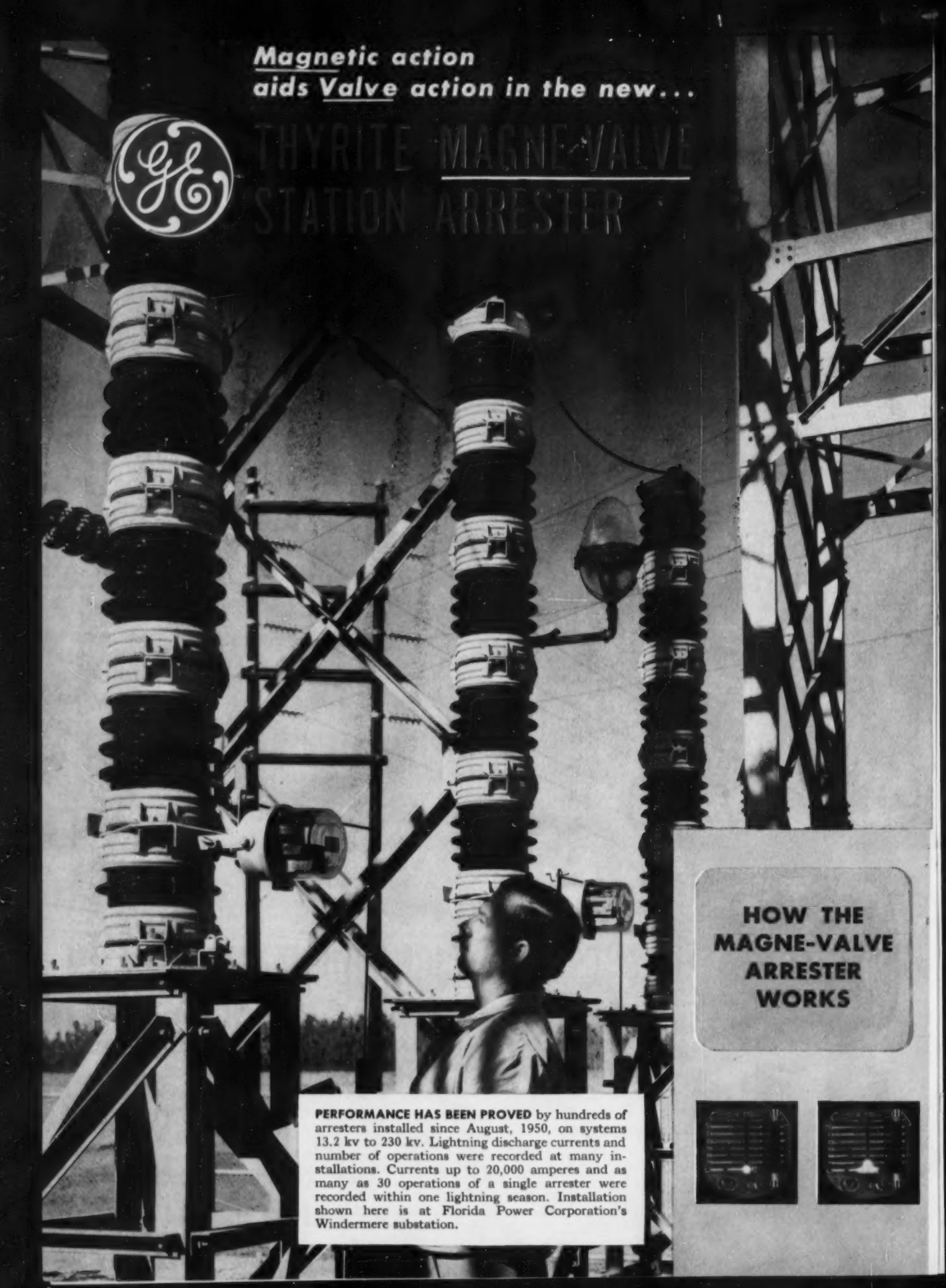
**Reg. Trademark of General Electric Co.*

GENERAL ELECTRIC

READ THE FULL STORY ON THE FOLLOWING PAGES ▸

Magnetic action
aids Valve action in the new...

THYRITE MAGNE-VALVE STATION ARRESTER



PERFORMANCE HAS BEEN PROVED by hundreds of arresters installed since August, 1950, on systems 13.2 kv to 230 kv. Lightning discharge currents and number of operations were recorded at many installations. Currents up to 20,000 amperes and as many as 30 operations of a single arrester were recorded within one lightning season. Installation shown here is at Florida Power Corporation's Windermere substation.

HOW THE MAGNE-VALVE ARRESTER WORKS

20% better protective level
3 times greater endurance

The new Thyrite* Magne-valve arrester is a major advance in reliability of co-ordinated protection of station apparatus. Let's appraise it!

FOR APPARATUS HAVING STANDARD BIL'S—

You get an unprecedented margin of protection that assures co-ordinated protection for many times higher stroke currents—even 100,000 amperes. This super-protection is especially valuable where lines or substations are not shielded or where practicable shielding may not be infallible.

You get an extra margin of protection which tends to offset adverse effects of separation between arrester and apparatus—enabling co-ordinated protection to apparatus at greater distances from the arrester.

FOR H-V APPARATUS HAVING REDUCED INSULATION—

You get as large a margin of safety in protecting 1-step reduced BIL insulation as was heretofore possible only when protecting full insulation (standard BIL). Hence, the new arrester enables a more positive approach toward reduced insulation and resulting tremendous savings in apparatus investments.

FOR DRY-TYPE TRANSFORMERS—

You get a good margin of protection—heretofore limited. Although oil- or askarel-filled transformers are distinctly preferable for connection to lines exposed to lightning, the decidedly lower impulse strength of dry-type transformers can now be better protected.

FOR APPARATUS HAVING DEPRECIATED INSULATION—

You get more positive protection—to preserve and greatly extend the operating life of old but important apparatus.

Reg. Trademark of General Electric Co.

FOR AC ROTATING MACHINES—

You get as good margin of protection to even impedance-grounded neutral rotating machines using ungrounded-neutral 100% rating arresters, as was heretofore practicable with only grounded-neutral 80% rating arrester. And for grounded-neutral machines, you can now limit the lightning stresses to 80% of the machine's 1-minute hi-pot test level. Both are important achievements for better protection of generators, synchronous condensers, and motors, alike.

FOR ALL THESE APPLICATIONS—

You get full-fledged uncompromised *station* arrester protection—6-inch diameter low-resistance Thyrite valve-disk with exclusive integrally fired ceramic insulating collar, the most efficient valve element ever offered.

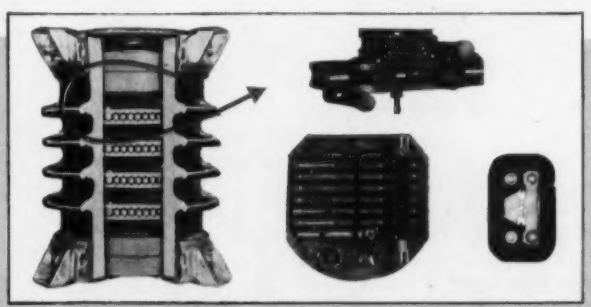
You get straight-in-line, low-resistance discharge path—28 sq. inches of cross-sectional area, with no tortuous up-and-down impedance.

You get over 3 times greater discharge capacity and thermal endurance—plenty of "guts" for withstanding high lightning currents, multiple lightning strokes, long-duration lightning discharges and severe switching surges.

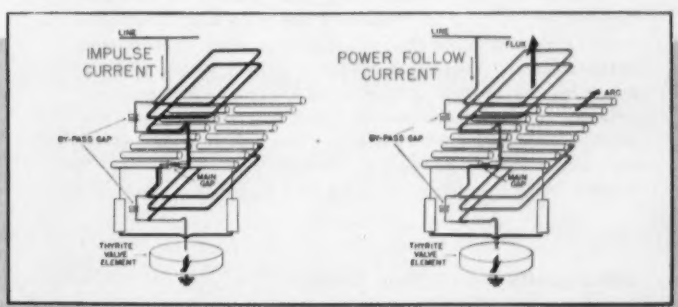
You get greater endurance now—and it protects you for future increasing discharge duty on station arresters attending trends to higher voltage lines, longer lines, greater lengths of cables, and more shunt capacitors, which increase the stored CE^2 energy in switching surges.

For more information about this new station arrester, get in touch with your nearest G-E Apparatus Sales Office or write for Bulletin GEA-1304 to Section 432-5, General Electric Company, Schenectady 5, N. Y.

GENERAL ELECTRIC



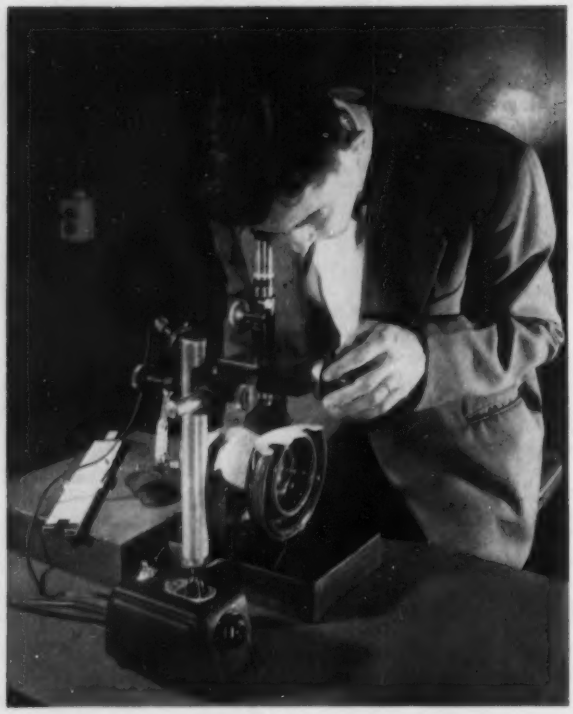
Cut-away view of new arrester showing new gap units and their components. Gap unit (circled in red) consists of 7 pairs of adjacent gap electrodes within the field of 2 magnetic coils. One pair of electrodes constitutes main gap which controls impulse sparkover sensitivity; other pairs of electrodes form multigap path for arc-interruption of the power follow-current.



Sketch at left shows path of lightning current. Each coil has a pre-ionized shunt gap that by-passes lightning current to the discharge path shown in red. Sketch at right shows path of 60-cycle power follow-current. After lightning sparkover, the 60-cycle power follow-current flows through the coils, as shown in red, creating magnetic flux. Arrows indicate direction of magnetic flux and blowout motion of arc, which motion is the same for either polarity of the 60-cycle follow-current wave.

Film strip (from high-speed movies) shows how magnetic force sweeps power follow-current arc progressively from main gap (see extreme left) to as many as 14 multigaps in series (see second from extreme right) for efficient arc-interruption in less than a half cycle. The arc-path moves so rapidly that even hundreds of interrupting operations cause no harmful scarring or burning of gap electrodes.

PRODUCT NEWS



(1) AN ENGINEER in Locke Department's Baltimore laboratory tests the glaze thickness of one of the manufacturer's new Microglaze suspension insulators. A new technique used is claimed to give the first scientific control over glaze thickness in insulator manufacture. Because an insulator's ability to resist mechanical impact varies with glaze thickness, Locke engineers explain, glaze thickness on the Microglaze insulators is held within what research has proved to be a range of peak strength. Uniform peak strength, even color and smooth appearance are assured on insulators produced by hundreds or by thousands, it is claimed. An eight-page folder, "The Story of Microglaze Insulators," may be secured from Locke Department, General Electric Co., Baltimore

Disconnects Have New Design

(2) James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Mo.

This new line of group-operated, rotating-insulator, side-break disconnects has no flexible shunts, has only two moving parts and one exposed contact, the manufacturer reports.

The rotating jaw contact contributes importantly to the simplicity of the disconnect and the reduced number of moving parts, it is stated. It is said to have exceptional ice-breaking ability, derived from the high leverage developed as the jaw rotates around the blade. The 45° rotation of the jaw is controlled by movement of the blade alone, without aid of springs or cams. Accidental rotation of the jaw with the switch open is impossible, the manufacturer states, because it is positively positioned by powerful contacts bearing on the square sides of the supporting shaft.

Current transfer from the pivot end of the blade to line terminal is through a round vertical shaft extending perpendicularly above the rotating insulator and rotating between constant-contact fixed contacts.

All current transfers are made by high-pressure, silver-to-silver contacts; none of the pivots or bearings for mechanical operation carry current. All contacts are full wiping, self-cleaning on both opening and closing of the blade. Movable contacts rotate between fixed contacts

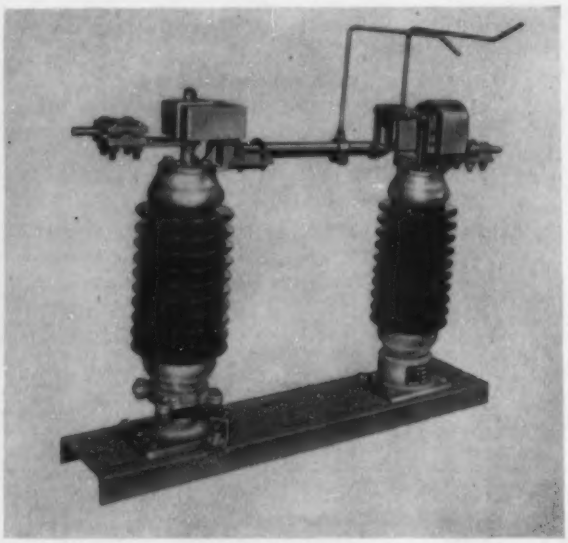


Photo shows one pole of switch in recently developed Kearney line

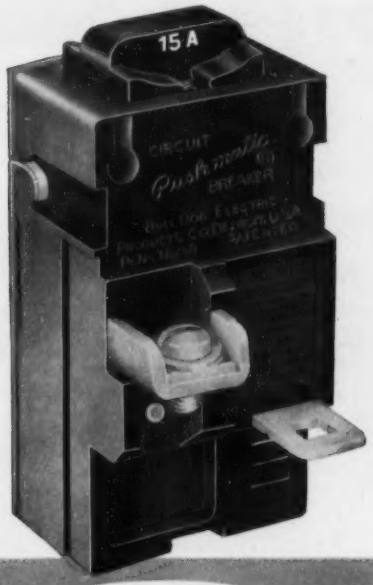
under constant-contact, constant-pressure conditions. Iridized aluminum housings enclosing contacts for current transfer between blade ends and line terminals protect them from ice, dirt and corrosion.

Rotating parts above the insulators operate in oilite bearings. The rotating insulator is supported by a sealed ball bearing. Heavily plated high-pressure terminals accommodate aluminum or copper conductors from No. 4 solid to ¾ in. IPS.

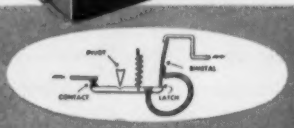
These disconnects are rated 400 and 600 amp, 7.5 through 69 kv for either horizontal or vertical mounting.

See Coupon on Page 64

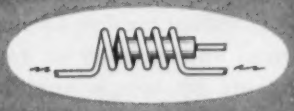
For manufacturers' bulletins on these products, fill in and mail the coupon on page 64



ONLY BULLDOG DUO-GUARD PUSHMATICS PROVIDE DOUBLE PROTECTION



Simplified diagram of thermal element. Overloaded circuit heats bimetal, causing it to expand. Latch is released and pulled upwards by steel spring, breaking circuit.



Simplified diagram of magnetic element. High overloads or shorts set up magnetic field in coil. Magnetic field instantly activates metal plunger which releases latch. Spring pulls latch upward, instantly breaking the circuit.

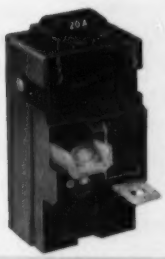
Duo-Guard Pushmatic circuit breakers provide double protection because they use *separate* protection elements. Only BullDog Duo-Guards have both a thermal element and a wound-coil magnetic element.

The thermal element (bimetal strip) protects branch circuits from "normal" overloads, and guards against nuisance tripping. The magnetic element (wound coil solenoid) protects branch circuit wiring and insulation, and properly connected lamp and appliance cords, against damage from shorts and dangerous overloads of high intensity.

Add BullDog's exclusive push-button control to the Duo-Guard feature, and you have the world's most efficient circuit breaker. No other breaker—at any price—offers as much. Many cost more. Get complete details about the Duo-Guard Pushmatic—the standard BullDog breaker—and Electri-Center panelboards. Write, today, for free new Bulletin PM-365. BullDog Electric Products Company, Dept. EW-24, Detroit 32, Michigan.

©BEPCO

THOROUGHBRED IN ELECTRICAL EQUIPMENT



Extra protection at 20 amp.

The new 20-amp. Duo-Guard provides the same short-circuit protection as the 15-amp. Cords, lighting, appliances and branches get quicker acting protection from dangerous electrical faults. At the same time, the 20-amp. Duo-Guard carries its full-rated load and prevents nuisance tripping.

BULLDOG
ELECTRIC PRODUCTS COMPANY

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES

Coast Electric & Manufacturing Company
1733 N. E. Seventh Ave.—Tel. TUxedo 5191
Portland 17, Oregon

Safety Switchboard Company
910-89th Ave.—Tel. LOckhaven 9-7001
Oakland 21, California

BullDog Electric Products of Los Angeles
2885 E. Washington Blvd.—Tel. ANgelus 9-8101
Los Angeles 23, California

Young Electric & Manufacturing Company
2134 Curtis Street—Tel. AComa 4841
Denver 2, Colorado

new Thomas "Chip-Proof" insulator

A new corrugation design positively prevents chipping or breaking of inner petticoats. This protection is assured by eliminating the destructive bumping of caps or clamp fittings against the petticoats, yet gives complete interchangeability with all current designs as required by NEMA Standards. Only this new Thomas design (Patent applied for) can guarantee the virtual impossibility of damaging inner petticoats by rough handling during assembly or disassembly in the field.

● Naturally, we are excited. We believe our new petticoat design to be the answer to the insulator breakage problem, during construction, which has plagued the Industry for years. This design accomplishes positive elimination of insulator breakage during construction due to rough handling in coupling and uncoupling insulator units and in installing hardware fittings to the insulator strings.

Of course, the greatest benefit of this new design will be realized with the close-coupled units, but for all insulator spacings, our new design assures more ruggedness with resulting longer life . . . and at no additional cost to you!

The foregoing are bold statements. However, our most severe tests prove them and they are too important for you not to verify.

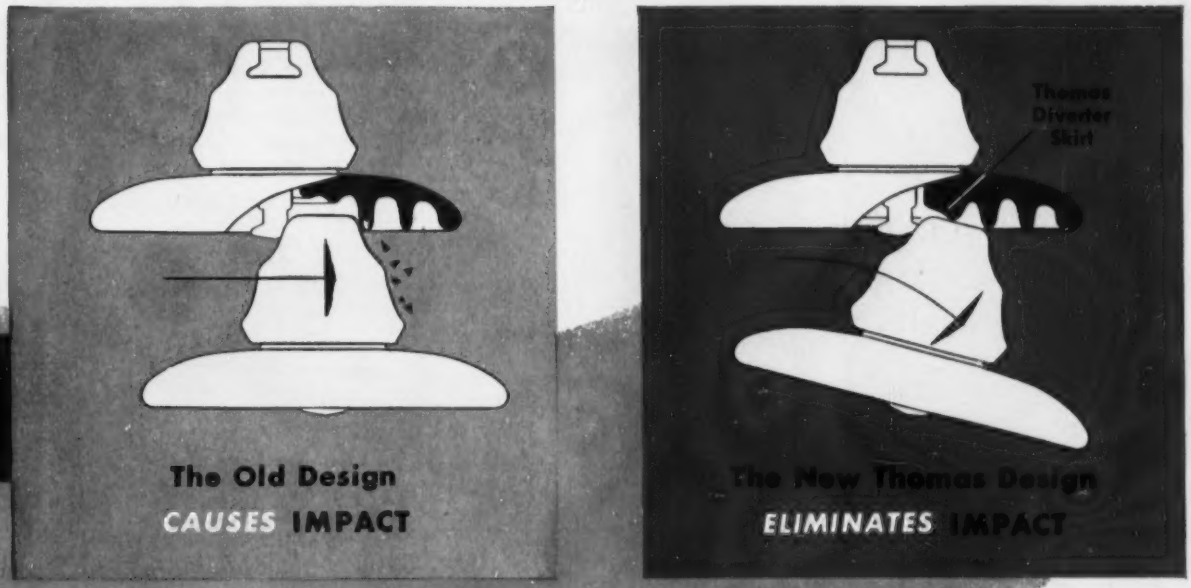
We suggest that you order TODAY, a standard crate of 6—No. 21239 THOMAS 1953-DESIGN SUSPENSION INSUALTORS. Test them thoroughly . . . and compare with other close-coupled designs.

The R. Thomas and Sons Co.

1873 THOMAS INSULATORS our 80th year RELIABILITY 1953

LISBON, OHIO
NEW YORK CHICAGO

Sales Representatives: **C. G. Anderson,** *Chicago* **● E. B. Anderson Co.,** *Detroit* **● Conrad R. Bangh, Omaha ● Ken H. Best,** *Seattle* **● Nellis B. Bronner, Jr.,** *Syracuse* **● R. E. Cunningham & Son,** *Los Angeles* **● W. H. Eddy Electric Products, Inc.,** *Phoenix* **● Engineer Sales Co.,** *St. Petersburg* **Electrical Distributors Co.,** *Philadelphia* **● Hamilton Associates,** *Denver* **● Geo. E. Honn Co.,** *San Francisco* **● Hugo Sales Co.,** *Minneapolis* **● J. P. Lane Co.,** *St. Louis* **● John G. Pettijohn Co.,** *Knoxville* **● H. E. Ransford Co.,** *Pittsburgh* **● J. F. Schaefer & Co.,** *Kansas City* **● R. J. Sullivan Co.,** *Boston* **Tafel Electric & Supply Co.,** *Louisville* **● Walter E. Thompson Co.,** *Birmingham* **● Triangle Electric Supply Co.,** *El Paso* **● United Electric Supply Co.,** *Salt Lake City* **● Williamson Sales Co.,** *Shreveport, Amarillo, Corpus Christi, Dallas, Houston, New Orleans, Pine Bluff* **● Representatives in other principal cities**



eliminate *Impact* and you eliminate breakage

For many years, The R. Thomas and Sons Company has been well aware of the insulator breakage problem during construction. But none of us imagined the solution to be so simple and yet so effective.

Examine carefully the two drawings above. Note that with the OLD design (illustrated at the left) when the lower insulator is uncoupled, it can easily be SLAMMED directly in a straight line against the innermost petticoat. Obviously, this action results in a chipping or breaking IMPACT.

Now note how the THOMAS DIVERTER skirt (illustrated at the right above) eliminates impact. This DIVERTER skirt (Patent applied for) is simply a heavy corrugation designed with a contour that *diverts* the lower insulator or fittings away from any petticoats.

No matter how roughly the insulators are handled, when the cap is pulled off the ball pin, it will first strike the DIVERTER which it cannot break. This glancing blow will deflect any destructive IMPACT from the lighter petticoats. Simple . . . but EFFECTIVE.

All standard Thomas 10-inch suspension insulators now have this feature . . . at no extra cost.

Specify **THOMAS INSULATORS—THE BEST BY LINE TEST**

The R. Thomas and Sons Company is a manufacturer and designer of all types of porcelain insulators . . . pin-type, switch, suspension, spools, guy-strain, bushings and special high-voltage porcelain. In addition, Thomas supplies associated line hardware, clamps, fittings, and so on.

New service entrance devices—XO34-RO, left; XO44-RF, right

Service Entrance Devices

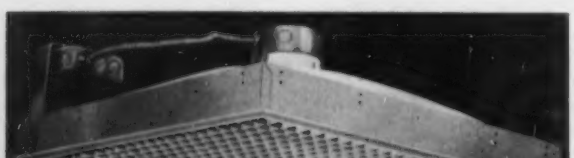
(3) Square D Co., 4335 Valley Blvd., Los Angeles, Calif.

Two new service entrance devices, the XO34 and the XO44, are applications of the manufacturer's XO unit breaker. They are raintight devices, available for surface or semiflush mounting, using XO structures.

XO34 measures 7½x19½x4⅛ in. It is rated at 70 amp, contains a four-jaw meter socket and sealing ring, wired from the load side of the socket to the line terminals of an XO3 basic structure. Dead-front plate has conventional twistouts for breaker units.

Measurements of XO44 are the same. It is rated at 100 amp and is similar to the XO34 but it contains an XO4 basic structure. It permits additional circuit combinations of six subdivisions of load or, where required, can contain a 50-amp two-pole main breaker (XO250) wired as a main disconnect for combination single- and double-pole branch circuits.

Both models are quick-make, quick-break circuit operations. They have ambient compensation to prevent nuisance tripping and are thermal-magnetic, giving complete two-way protection against both moderate and heavy overloads. Use of unit breakers in raintight enclosures provide for a wide range of circuit combinations, the manufacturer points out.

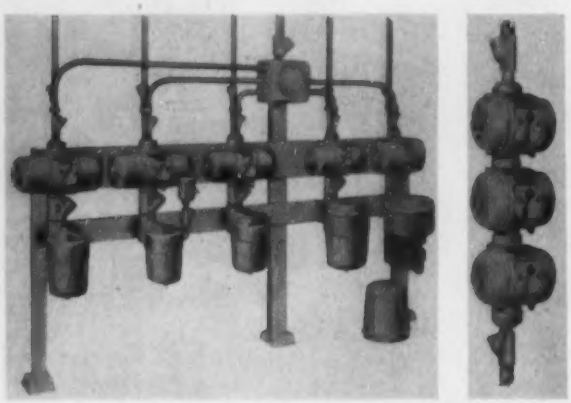


Prewired Lighting System

(4) Smoot-Holman Co., Inglewood, Calif.

Four-step installation is a feature of this Silvray Skylike unit for recessed lighting systems. It has factory prewiring and preassembly. The installer (1) nails or wires frame in ceiling opening; (2) connects service conduit to outlet; (3) locks socket screws to reflector in special keyhole slots; and (4) engages unit mounting screws to frame.

The unit uses 150-w/500-w silvered bowl incandescent lamps; may be installed singly or in multiples in any of ceiling; is Underwriters' approved.



Left: Four circuits operate under hazardous conditions; fifth starter is exposed for maintenance. Right: Banked installation, CB Unilets

Circuit Breaker, Motor Starter and Combination Enclosures

(5) Appleton Electric Co., 1701-59 Wellington Ave., Chicago 13, Ill.

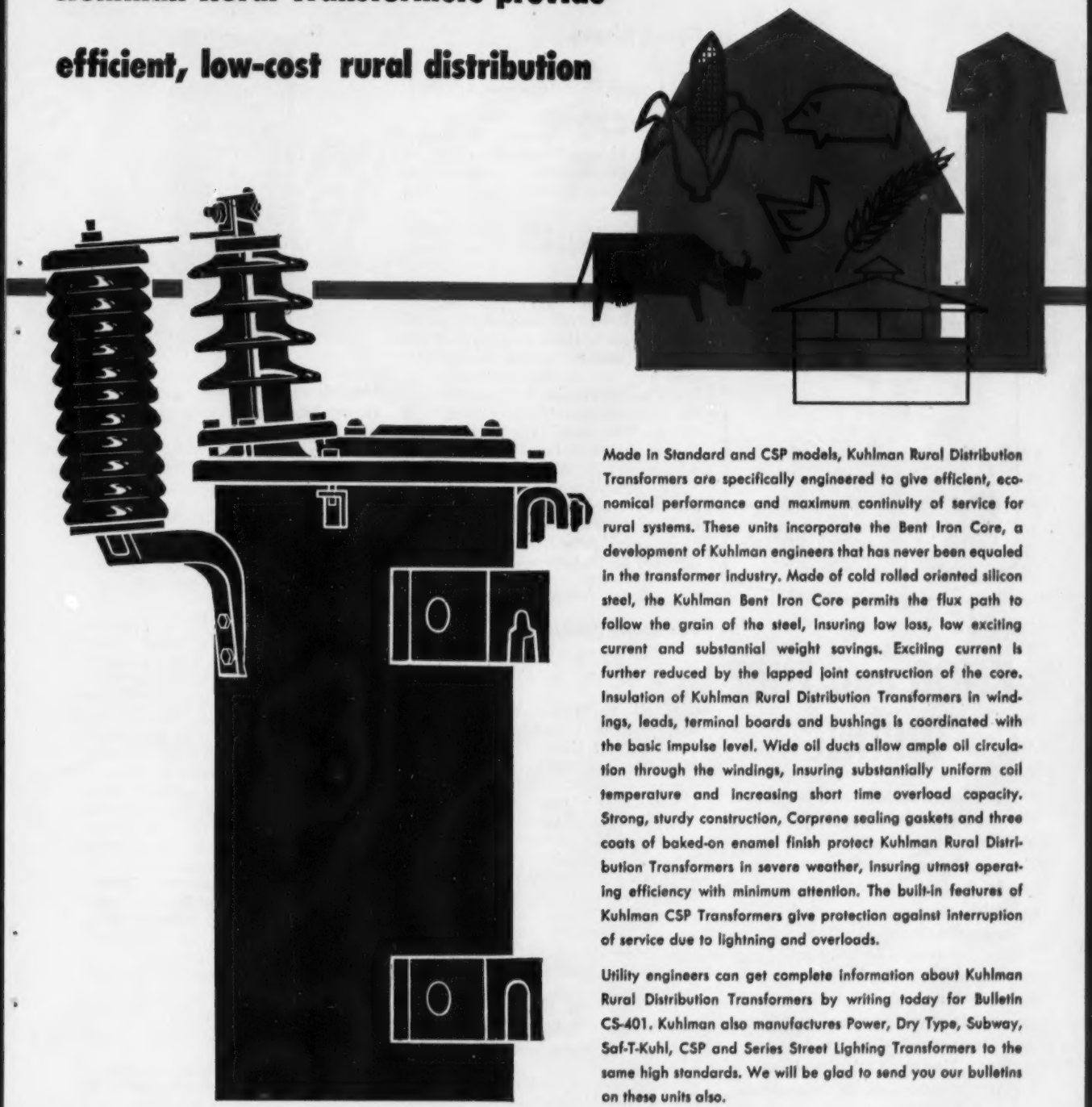
This new line of explosion-proof, dust-tight, raintight circuit breaker, motor starter and line starter combination enclosures (trade name Unilets) carry UL approval and, with a new UL-approved sealing Unilet, may be joined in combination to meet UL requirements in certain sizes.

Each component Unilet for circuit breaker, motor starter and seal possesses full seven-thread engagement at the coupling joints as well as on the bolt-free covers. According to the manufacturer, absolutely safe entrance to individual motor starters for maintenance work is assured in both single and banked combinations in hazardous areas without shutting off other branch circuits. No live circuit breaker wires are exposed while the motor starter enclosure is open on a line starter combination, it is stated, and considerable money savings are claimed for this feature, because there is no unnecessary down time on machines and equipment when these Unilets are installed.

Other features include: UL approval on banked circuit breaker Unilets up to groups of three for Forms 1 and 2; lightweight construction for easy installation without use of heavy lift equipment; standardized mounting frames for interchangeability of most well-known makes of circuit breakers and motor starters in certain sizes; simplified straight-through wiring; versatile hub adaptors that permit use of over-size conduit and conductors; streamlined push-button and pilot-duty control.

This new line covers all breaker-starter control equipment of leading firms rated to 225-amp breaker loads and to 100 hp on three-phase induction motors at 600 v maximum, the manufacturer states. Details are in Appleton's bulletin 12-A.

Kuhlman Rural Transformers provide efficient, low-cost rural distribution



Made in Standard and CSP models, Kuhlman Rural Distribution Transformers are specifically engineered to give efficient, economical performance and maximum continuity of service for rural systems. These units incorporate the Bent Iron Core, a development of Kuhlman engineers that has never been equaled in the transformer industry. Made of cold rolled oriented silicon steel, the Kuhlman Bent Iron Core permits the flux path to follow the grain of the steel, insuring low loss, low exciting current and substantial weight savings. Exciting current is further reduced by the lapped joint construction of the core. Insulation of Kuhlman Rural Distribution Transformers in windings, leads, terminal boards and bushings is coordinated with the basic impulse level. Wide oil ducts allow ample oil circulation through the windings, insuring substantially uniform coil temperature and increasing short time overload capacity. Strong, sturdy construction, Corprene sealing gaskets and three coats of baked-on enamel finish protect Kuhlman Rural Distribution Transformers in severe weather, insuring utmost operating efficiency with minimum attention. The built-in features of Kuhlman CSP Transformers give protection against interruption of service due to lightning and overloads.

Utility engineers can get complete information about Kuhlman Rural Distribution Transformers by writing today for Bulletin CS-401. Kuhlman also manufactures Power, Dry Type, Subway, Saf-T-Kuhl, CSP and Series Street Lighting Transformers to the same high standards. We will be glad to send you our bulletins on these units also.

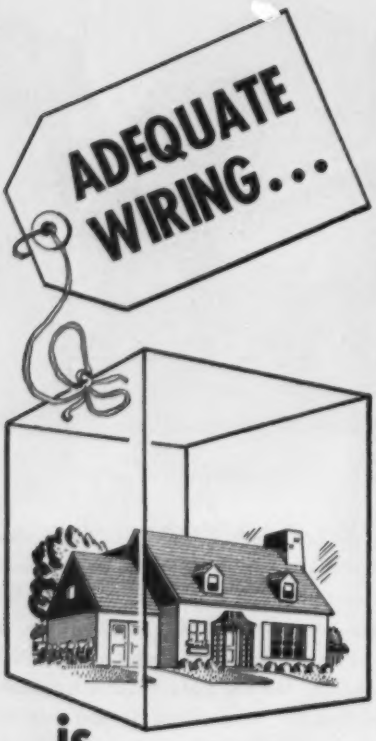
143-T

KUHLMAN

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • Southern Division, CRYSTAL SPRINGS, MISSISSIPPI

EXPORT REPRESENTATIVE: INTERNATIONAL STANDARD ELECTRIC CORP., 15TH FLOOR, 50 CHURCH STREET, N. Y. 7, N. Y. CABLE ADDRESS: MICROPHONE, N. Y.

SIXTY YEARS OF PROGRESS IN THE ELECTRICAL INDUSTRY



is

KNOB and TUBE WIRING

Adequate wiring—as recognized nationally—represents plenty of convenience outlets and controls, properly located — and backed by large capacity electrical wire.

Any size electrical wire will carry *more current* with *Knob and Tube* wiring! Surprised? Most people are. Check the facts! Tables I and II of the National Electrical Code provide complete comparisons. You get 33% to more than 100% *extra capacity* with *Knob and Tube* wiring—the *first* approved wiring method in NEC. Still the best. Still unchallenged!

Specify Knobs and Tubes by Porcelain Products—synonymous with reliability for 60 years.

60 years ELECTRICAL PORCELAIN SINCE 1894 PP INC.

Porcelain Products, Inc.
FINDLAY, OHIO

Circuit Breaker

(6) Federal Electric Products Co., 50 Paris St., Newark 5, N. J.

A new Stab-lok circuit breaker device, the AB-192, is designed for homes with an air-conditioning unit or an extra large range. It features a sequence bussed branch panel making it possible to use 10 single-pole or five double-pole branch circuit breakers, controlled by one 50-amp main breaker.

Four more 50-amp main breakers may be used for major appliances or other high-wattage loads than can be served with a three-wire circuit, the manufacturer points out. By using a split bus, five of the breakers in the lower compartment are parallel with the 100-amp main breaker in the top section. The main lugs to which the line is attached have a capacity of 200 amp.

The new device has six operating handles to disconnect service, designed in conformance with the NECode. It is completely wired and is constructed to fit between studs.

Parabola-Type Louver

(7) Day-Brite Lighting Inc., 16 N. 9th St., St. Louis, Mo.

Claimed to reduce the lengthwise brightness of a parabolic troffer by 50% without changing the efficiency of the fixture, Para-Louver is designed for use with the manufacturer's Alzak aluminum units to give low-brightness comfort from all viewing angles.

To provide parabolic surfaces on the flat louvers, the designers divided a parabola into segments and projected these to the flat surface. A second series of parabola segments with an axis to reflect the light upward was projected to join the others so that all light striking the louver could be controlled.

In fabricating the louvers coining was the method chosen. The parabolic surfaces are coined or pressed into aluminum louver plates under great pressure and are uniform. With this louver the Alzak aluminum viewing brightness lengthwise is reduced from 1.2 candles to about .6 candles per square inch without loss of light distribution efficiency.

For manufacturers' bulletins with additional information on these products, fill in coupon on page 64

Negative-Sequence Generator Relay

(8) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

A negative-sequence overcurrent relay for protection of large generators is designed to initiate action to remove a generator from a faulted line when the damaging effect of negative-sequence current approaches the maximum allowed.

In this type COQ, a negative-sequence current filter with output proportional to the negative-sequence input operates a type CO overcurrent relay which in turn initiates tripping of a circuit breaker. Rated at 3 to 5 amp, 60 cycles, the COQ has taps at 3, 3.25, 3.5, 3.8, 4.2, 4.6 and 5.0 amp. A tap value corresponds to the current received from the auxiliary transformer secondary, and this current in turn corresponds to 1.0 per unit negative-sequence current in the generator being protected.

Relay characteristics are matched to generator characteristics by means of eight dial settings from 4 to 11. The dial setting 4 is for a generator characteristic of 30, meaning it will take 30 seconds to close the relay contacts at 1.0 per unit generator negative-sequence current. The time dial setting 11 is for a generator characteristic of 90.

The COQ is available in Flexitest projection or semiflush case and in the standard rectangular glass projection case.

(9) **SWITCHES** — Pass & Seymour Inc., Syracuse 9, N. Y., has introduced a new line of switches designed for long life at full load, maximum service and quiet operation. They come in single pole, double pole and three way with brown or ivory handles in 15- and 20-amp types. They will fit shallow boxes; can be mounted in any position; can be wired at back or side, the manufacturer states. Ratings: 15 amp, 120 v a-c, 277 v a-c and 20 amp, 120 v a-c, 277 v a-c.

where reliability is the first requirement . . .

it's SPANG® Conduit

for Manhattan's new Beekman-Downtown Hospital

The new, modern Beekman-Downtown Hospital, located on New York's East Side, was especially designed to serve the unusual variety of medical needs found in this type of neighborhood. This 5½-million-dollar hospital is equipped with an extensive out-patient department for accidents and emergency work, large charity wards and beautifully equipped private rooms—plus especially attractive quarters for interns, nurses and other staff members.

The many and unusual electrical requirements of a hospital call for the very finest electrical installations. That's why Spang Conduit was chosen to protect the wiring throughout the building. Spang Conduit is quality-controlled from raw material to finished product. This means Spang Conduit is easier to work with . . . easier to cut, bend and thread . . . providing an economical, time-saving installation.

And where reliability is so important, a Spang installation can be counted on to give years of satisfactory and dependable service. Ask any architect or contractor. They'll tell you the same thing.

Specify Spang for your next job. Take your choice of Spang Cenlaco "Hot-Dipped," Spang Central White Electrogalvanized, Spang Central Black or the new Spangleam EMT. Your distributor carries the complete Spang line.

Owner: **Beekman-Downtown Hospital, New York City**

Architect-Engineer: **Lorimer & Rose, New York City**

Structural Engineers: **Roberts & Schaefer Company, New York City**

Mechanical Engineers: **Karsunky, Weller and Gooch, New York City**

General Contractor: **Cauldwell-Wingate Company, New York City**

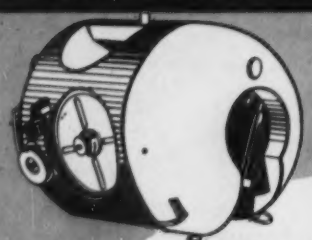
Electrical Subcontractor: **Plymouth Electric Company, New York City**

Spang Distributor: **J. A. Edwards and Company, New York City**

SPANG® CONDUIT

SPANG-CHALFANT
Division of The National Supply Company
GENERAL SALES OFFICE:
TWO GATEWAY CENTER, PITTSBURGH, PA.
District Offices and Sales Representatives in Principal Cities

★STAR PERFORMER



NEALE PULL TYPE MODEL K SPINNER

AND HOW

- Reduces Cost
- Saves Splices
- Cuts Inventories
- Solves "Congested Area" problems

CABLE SPINNING EQUIPMENT CO.

3100 TOPEKA AVE.

TOPEKA KANSAS

Phone 2-7234

OVERSEAS SALES:

Ericsson Telephone Sales Corp. of New York

Automatic Electric of Canada

Pirelli of Great Britain

Heating Tape

(10) Cox & Co., 16 E. 43rd St., New York 17, N. Y.

Called Ribbon Heat, this product is a plastic tape in which the patented use wire heating element is sealed. One end of the tape in the UL-approved type has flexible leads, which can be connected to any 110- or 220-v approved outlet box.

It comes in lengths of 20 to 60 ft for 110-v service and from 40 to 120 ft for 220-v use. It is also available with a plug, in place of the leads, for use in a convenience outlet.

The tape is suggested by the manufacturer for such preventive maintenance jobs as preventing water pipes from freezing and keeping gutters, spouts and drains free of ice. It is also designed for production applications.

Heating Panel

(11) Berko Electric Mfg. Corp., 212-40 Jamaica Ave., Queens Village, N. Y.

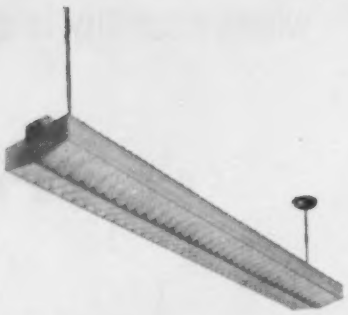
Designed for heating rooms with large window areas and low sills, these low-boy model radiant heating panels feature a new construction using stainless steel and carbon contact and can be installed end to end to give the appearance of one continuous unit.

The heating unit consists of a sheet of Pyrex glass 36x8 in. and one-half inch thick. The entire back surface is treated with an electrical conductive coating approximately 16 millionths of an inch thick and becomes one solid heating element, the manufacturer states.

The outer frame is fabricated from 20-gage CR steel and is bonderized before the satin aluminum grey finish is applied. All units are equipped with Kromolite plated guards.

(12) RADIO EQUIPMENT—New mobile models have been added to Motorola's line of 25-54-mc FM 2-way radio equipment. These 30- and 60-w models have new features such as universal 6-12 VDC operation, dual interrupter vibrator power supply and reduced primary power drain. They may be used interchangeably in 6- and 12-v vehicles without revising internal wiring. Designed for automobile truck installation, the equipment uses separate transmitter, receiver and power supply chassis assembled into a drawer-type housing. Details from Motorola Inc., Communications & Electronics Division, Technical Information Center, 4545 W. Augusta Blvd., Chicago 51, Ill.

(13) SILICONE RESIN — SR-17 developed by General Electric Co.'s Silicone Products Department, Waterford, N. Y., is said to possess an unusual combination of heat resistance, low temperature flexibility and high bonding strength. It can be used for a variety of insulating applications that ordinarily require several different materials, the manufacturer claims.



Luminaire

(14) F. W. Wakefield Brass Co., Vermilion, Ohio

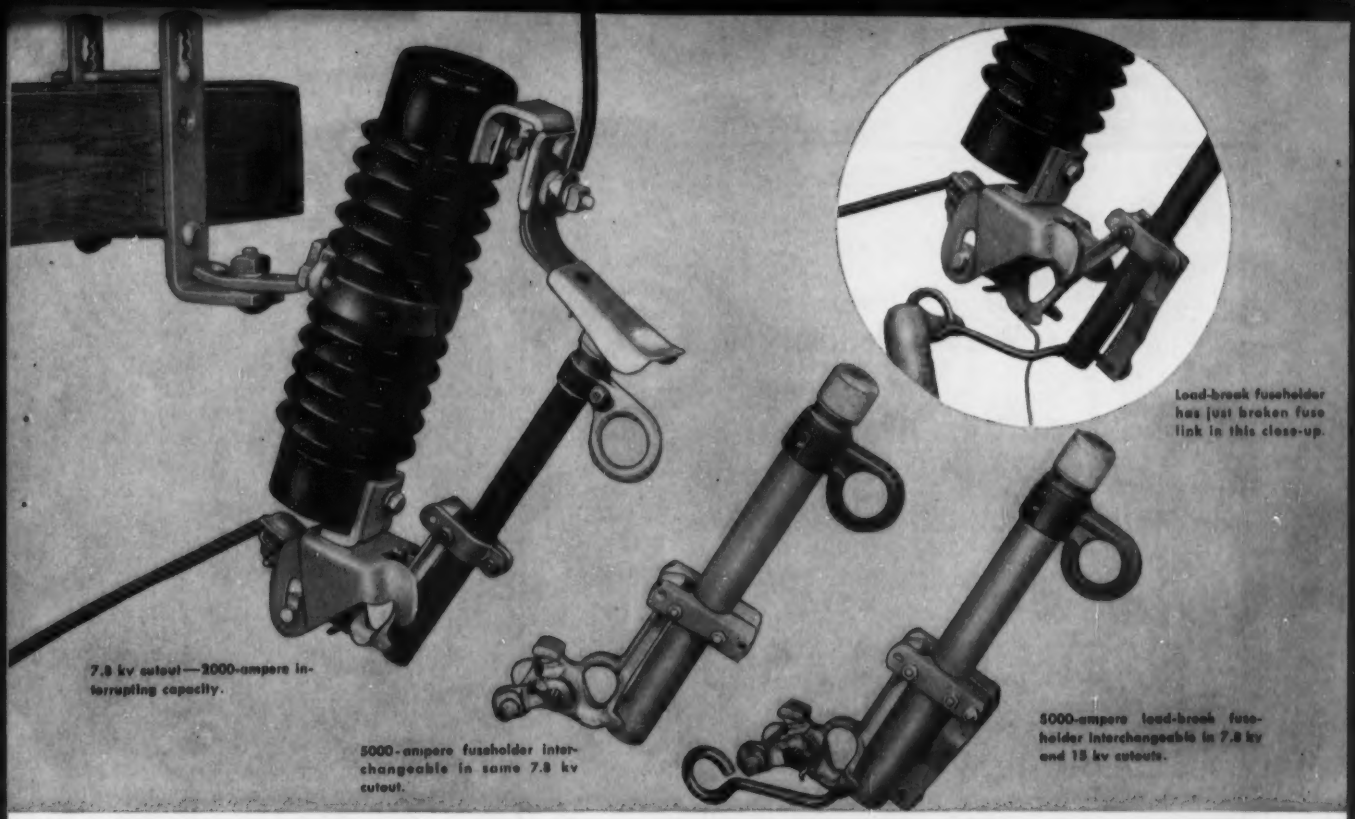
The Cavalier features full-length side panels with no opaque metal framing. Side panels are supported internally by a steel frame. The entire unit provides low-surface brightness above the specified 45° shielding angle, the manufacturer states. To give uniform low brightness over the entire luminaire a low-brightness finish is used on louvers, side reflectors and channels. The plastic side panel is gaged to 100 foot-lamberts. Lighting performance is designed to meet the American Recommended Practice of School Lighting, according to the manufacturer.

This unit comes in either 4- or 8-ft lengths equipped with rapid- or instant-start lamps. Mechanical features include an adjustable ceiling strap, which adjusts for either out-of-line or in-line error in location of mounting points; a hook-on stem assembly for speed and ease of mounting; a sliding stem plate within the channel, which can be moved from end to end of the unit to allow mounting in any desirable point.

Mounting may be on-surface, on 5-in. stem and canopies, on 20-in. stem, or individually on a twin-stem canopy assembly. Louvers are lowered by press buttons and are supported by safety chains when lowered.

(15) TRANSFORMERS — A 1,000-kva, 4,160 delta-480 delta transformer designed to meet or exceed NEMA, ASA and JIC standards has been announced by Hevi Duty Electric Co., Milwaukee 1, Wis.

(16) TRANSMITTER CONTROL — A control system for unattended broadcast transmitters designed and built in accordance with the recently announced FCC regulation has been announced by the Hammarlund Mfg. Co., 460 W. 34th St., New York 1, N. Y. According to the manufacturer, only a single audio-frequency telephone circuit is required; VHF or microwave may be used but no d-c circuit is needed. Other features listed: full control of up to nine separate circuits; remote telemetering of nine separate electrical quantities; up to four emergency alarm indications; fail-safe operations.


7.8 kv cutout—2000-ampere interrupting capacity.
5000-ampere fuseholder interchangeable in same 7.8 kv cutout.
Load-break fuseholder has just broken fuse link in this close-up.
5000-ampere load-break fuseholder interchangeable in 7.8 kv and 15 kv cutouts.

NEW G-E OPEN DROPOUT CUTOUT

For FAULT PROTECTION—standard or heavy duty and LOAD BREAK—up to full load at any power-factor.

New simplified design of General Electric 7.8 kv and 15 kv, 100-ampere cutouts have these extra features:

Birdproof Construction accomplished by unique method of clamping the mounting support to the opposite side of insulator from live parts.

Liberal electrical and mechanical strength. New hollow tube wet process porcelain has under-cut petticoats for generous creep and strike distance; and porcelain insert fired within tube provides inside solid barrier between top and bottom live parts. Screen prevents insect nest within porcelain. Clamping U-bolt around porcelain is insulated with molded polyvinyl chloride having excellent insulating and weathering characteristics.

Compression bolting to porcelain—top and bottom fittings are bolted to insulator with porcelain under compression—for maximum mechanical strength. Compression clamps inside the porcelain maintain tight assembly.

Shielded top contact and latch—by roof-shaped contour and having ball-point contact surface to top of fuseholder, the top contact and its latch are protected from dirt deposits and sleet.

Other distinctive features are retained: Hinge guides allow slamming fuseholder from any angle; threaded cap seal at upper end of fuseholder forces expulsion gases downward; silver-plated contacts shielded from corrosive agents; vertical or angle-tilted swivel mounting with EEI-NEMA bracket; latch provides time-delay opening—assures fault current interruption before dropout action occurs; fuseholder tube of fiber and fabric-base Textolite* is water resistant, will not warp or split; close coupling of fuseholder to porcelain prevents multiplication of recoil forces.

For more information on these new open cutouts, contact your nearest G-E Sales Representative, or write to General Electric Company, Section 433-4, Schenectady 5, New York.

*Reg. trade-mark of General Electric Company

You can put your confidence in—

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

News for Western Electrical Buyers

Next edition of Manufacturers' Directory will be November, 1954

LOOK IT UP
FIRST
in Electrical West's Manufacturers' Directory

- Western offices and sales headquarters of electrical manufacturers
- Where-to-Buy product directory
- Appliance service and repair parts stations
- Western representatives handling electrical lines

The only directory exclusively for Buyers of electrical equipment in the 11 Western States. Changing publishing date to November will enable us to make the Directory more complete, accurate and timely than ever.

News for electrical equipment advertisers

Next edition of Manufacturers' Directory will be November, 1954

ABP *ELECTRICAL WEST* ABC

Power Tool for Conduit Jobs

(17) Barth Corp., 12650 Brookpark Road, Cleveland 29, Ohio

This powered cable puller is portable and can be operated in any position for either pushing or pulling purposes, its manufacturer states. It pushes 25 ft of fish tape per minute around five 90° bends, stopping automatically if conduit is obstructed; pulls 15 ft of wire per minute into ¾ to 2 in. conduit; provides 175 ft of .060x¼-in. usable tape, the manufacturer reports. It operates on 115 v a-c or d-c and pulls 1,200 lb dead weight; weighs 65 lb.

The machine is attached to the conduit by means of brackets. Supports hold it in either vertical, horizontal or angle positions and there is said to be no strain on box or wall.

Tool

(18) Contact Inc., 238 Main St., Cambridge, Mass.

The Wire-Wrench is a tool for wrapping stranded or solid wire around terminals on boards or hermetic seals. According to the manufacturer, one or more wires can be wrapped around a terminal with a single twist of the wrist. An auxiliary feature is a drilled hole and a milled flat to be used for putting a hook in a wire, whenever needed. The tool may be used also for straightening bent terminals. Three sizes are available: No. WW1, for miniature terminals; No. WW2, for medium-size terminals; No. WW3, for large terminals.

(19) TERMINAL BLOCKS—Heavy-duty molded terminal blocks with nonseparable hinged covers have been announced by Buchanan Electrical Products Corp. These blocks come with either screw- or solderless-type contacts and in 4-, 6-, 8- or 12-circuit sizes with plain or numbered marking strips. They are rated at 750 v, 35 amp for the screw type and at 750 v, 50 amp for the solderless type.

STANDARD ENGINEER'S REPORT

DATA

LUBRICANT Calol O.H.T. Grease

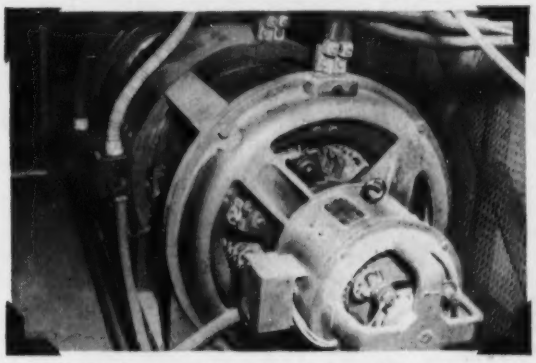
UNITS Electric motor bearings—fractional to 100 H.P.

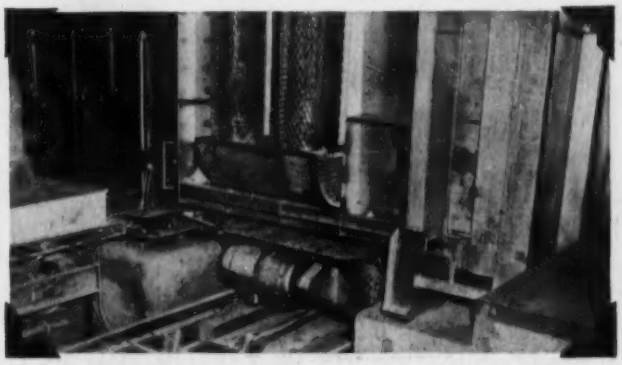
OPERATION Machine tools, furnaces, generators

CONDITIONS High ambient temperatures

FIRM Ryan Aeronautical Company, San Diego, Calif.

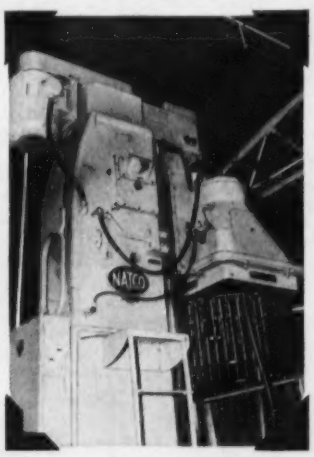
Special grease ups lubrication period to 5 years!



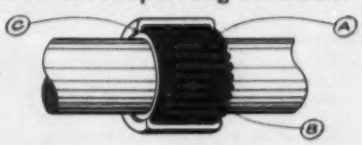


1900 MOTORS, from this 100 H.P. motor-generator set to fractional H.P. units, are lubricated on a 5-year-interval schedule with Calol OHT Grease in the Ryan Aeronautical Company plant, San Diego, Calif. All grease gun fittings were removed after tests proved this special grease efficient in motors under exceptionally high ambient temperatures. The motor above is constantly in temperatures of 150°F. plus. It operates doors, and cars, loaded with jet-engine afterburners, for this heat-treating furnace.

CALOL O.H.T. GREASE also lubricates many motors for Ryan that operate under heavy loads, such as this 25 H.P. motor which runs the specially-designed 42-spindle multiple drill shown at right. Sealed in bearings, it has ended motor repairs brought about in the past in the Ryan plant by overlubrication and occasional missing of a fitting. This special grease is recommended for all types of bearings.



How Calol O.H.T. Grease protects bearings in severest operating conditions



Used in any type of bearing under any operating condition, high temperature-low speed, high speeds to 10,000 rpm, temperatures from minus 10°F. to 400°F., Calol O.H.T. Grease will last indefinitely.

A. Contains special oxidation inhibitor—helps prevent rusting, corrosion, hardening of grease at any time.

B. Resists high temperatures—eliminates coking and formation of deposits.

C. Provides excellent seal against water ...lubricates efficiently in slight moisture.

FREE CATALOG: "How to Save Money on Equipment Operation", a booklet full of valuable information, is ready for you. Write or ask for your free copy today.

CALOL

TRADEMARK "CALOL" REG. U.S. PAT. OFF.

STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

STANDARD OIL COMPANY OF CALIFORNIA

SAVES BOTH CIRCUIT AND CUSTOMER
(FOR 120/208 VOLT AC OR 125/250 VOLT DC NETWORKS)

POSITIVE PROTECTION AGAINST SUPERCURRENTS

Low voltage AC and DC networks give large utilities and their customers greater continuity of service and easy expansion of their systems. The only drawback to this type of network is the constant threat of danger from heavy short-circuit or fault currents. Shawmut's new FORM 208 Amp-trap eliminates this danger from these circuits. On actual test, its amazingly fast "chop-off" stops a short-circuit *even before it reaches the peak of its first ¼ cycle — even if the available peak current could reach* 560,000 *Amps!* It anticipates and prevents the destructive build-up of heavy fault currents so dangerous to office buildings, stores, hospitals, theatres, schools, etc. FORM 208 saves *both* circuit and customers.

USES & SPECIFICATIONS

Amp-trap FORM 208 is made for Entrance Switch Service, Underground Network Conductors, Distribution & Panelboards and other applications. It is built in Ampere ratings of 1000, 1200, 1600, 2000, 2500, 3000, 4000 and 5000 for Entrance Switch Service and for cable sizes from 4/0 to 1000 MCM. It runs "cool" and carries 100% of its rating with temperature rises less than those recommended in the Underwriters' Laboratories Standards for Fuses. The watt (power) loss is probably lower than for *any other over-current protective device.* Hence it may safely be installed in vaults and steel enclosures and subjected to long continued loads.

LOW IN COST — EASY TO INSTALL

FORM 208 Amp-traps clear fault currents long before they can burn or wreck bus bars and switch gear. Yet they are small in size, low in cost and easy to apply. They have a variety of mountings for flat, bus or tubular connectors. Adapters can be supplied for switch cubicles now equipped with copper or aluminum alloy links. FORM 208 is the "little brother" of the famous FORM 600 Amp-trap which has long been used so successfully on 600 volt circuits. Write today and find out about FORM 208 at once.

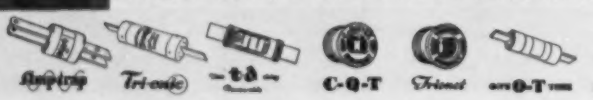
208
WITH TUBULAR TERMINALS

Copyright 1953 The Chase-Shawmut Co.

208 AMP-TRAP — "Awake At The Switch"

THE **CHASE-SHAWMUT** CO.

385 MERRIMAC STREET • NEWBURYPORT, MASSACHUSETTS



Oil Circuit Breaker

(20) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

A new three-phase oil circuit breaker, type G for 14.4- and 23-kv distribution service utilizes a single oil tank to contain all three circuit breaker poles, replacing the former three-tank arrangement. To inspect or service the breaker, all three poles are exposed simultaneously by lowering a single tank.

The single-tank arrangement is made possible by a new interrupter design. One enlarged De-ion grid arc interrupter per pole replaces the previous two per pole, giving the breaker ample short-circuit capacity with smaller over-all dimensions, the manufacturer states.

A single housing encloses the solenoid operating mechanism and associated control. The operating solenoid, control relays, terminal blocks and rectifier (when required for a-c control) are mounted on the back of the housing. Space is provided for the addition of a panel carrying reclosing relay, protective relays, ammeters and control switch. This panel may be added to any standard breaker at a later date if reclosing becomes desirable.

Continuous current ratings are available up to 1,200 amp with 8-cycle arc interruption up to 250 mva. Frame height is such that all live parts meet the National Safety Code requirements for height above ground, the manufacturer reports.

Summer Cooling Fans

(21) General Electric Co., Schenectady 5, N. Y.

Designed for use on evaporative-cooler, attic, air-circulating and window fans, a new line of two-speed FHP motors is small, lightweight, has resilient bases and may be mounted in any position, the manufacturer states.

The line is made up of split-phase and capacitor-start types with speeds of 1,725/1,140 rpm. Split-phase models are rated at 1/6, 1/4 and 1/3 hp, 115 v, 60 cycles. Capacitor-start models are rated at 1/2 and 3/4 hp, 60 cycles, 115 or 230 v. Single-speed motors for fan applications are available also in those ratings.

All motors are rated for 50 C temperature rise and come with or without automatic-reset thermal protection.

For More Data
Fill in Coupon, Page 64

thousands already using it to help Plan Better Industrial Lighting...

HELPS PLAN

Thousands of architects are using it to help them plan the type and kind of lighting systems which will best fit the particular industrial building they are designing. They also use it to show their clients the reasons why the recommendations call for RLM-certified units.

HELPS BUY

It gives buyers by the thousands, such as industrial executives, operating chiefs or plant maintenance heads, dollars-and-cents reasons why RLM-labeled lighting units are the best buy in terms of quality, performance and sustained high lighting efficiency.

here's how this new "Blue-Cover" RLM SPECIFICATIONS BOOK is already helping thousands:

HELPS SELL

It enables thousands of electrical contractors, electrical wholesalers, etc. to point out to their customers EXACTLY WHAT THEY ARE GETTING for their lighting dollar. It shows why the RLM Label on a lighting unit takes the place of over 1,500 words of specifications!

HELPS RECOMMEND

To thousands of purchasing agents it serves as a valuable yardstick in their evaluation of industrial lighting... an accurate guide to sound recommendations based on a comparison of the merits of different lighting units. It tells them what to look for and how to estimate lighting equipment value.

HELPS SPECIFY

To thousands of lighting men whose job it is to specify lighting units, it puts at their fingertips *21* different RLM Specifications, many complete with light distribution curves and coefficient of utilization tables. All are ready-made for use when drawing up lighting plans, layouts or recommendations.

This newly-revised "Blue-Cover" edition of the RLM Specifications Book of Industrial Lighting Units has just been made available to everyone who buys, sells and specifies industrial lighting equipment. Already thousands of copies have been requested and put to productive use in the planning of better industrial lighting.

NEW "UPWARD LIGHT" UNITS

In case you have not yet sent for your copy, be sure to do so before the supply is exhausted. This latest "Blue-Cover" edition of the RLM Specifications Book has been expanded to 52 pages, covering over 83 sizes and types of RLM-certified industrial lighting units. Featured are new specifications which embrace 15 variations of three new "Upward Component" RLM Semi-Direct Fluorescent Units which direct from 20% to 30% of the light upward. Also incorporated are important revisions and clarifications of existing specifications including new tables of typical coefficients of utilization and lighting distribution curves.

A request on your letterhead will bring your copy of this new RLM Specifications Book, as well as the pocket-size "RLM Questions and Answers" booklet, by return mail, without cost or obligation. Send now for this invaluable reference work to help you plan better industrial lighting!

RLM Standards Institute, Suite 815, 326 West Madison Street, Chicago 6, Illinois.

R-352

MANUFACTURER'S NAME
COMPLIANCE WITH [illegible] INSTITUTE [illegible]
RLM
ELECTRICAL TESTING LABORATORIES, INC

RLM STANDARDS INSTITUTE
INCORPORATED
The letters RLM stand for Reflector and Lighting Equipment Manufacturers

the Best
in safety...
wearability
KLEIN-KORD

Count on being really satisfied with Klein-Kord *nylon* Safety Straps. They're smooth and flexible, require no special care—and give you that important extra margin of safety. Made of multiple plies of strong, finely woven *nylon*, bonded together with frictioning and vulcanized in neoprene. Red center is a safety signal to "Stop When You See Red!" Equipped with finest drop-forged hardware.

ASK YOUR SUPPLIER

Foreign Distributor:
International Standard
Electric Corp., New York

KLEIN *Nylon* CLIMBER STRAPS for calf and ankle also available. Special straps furnished with rivets, burrs and punched for quick attachment to ring type climbers.

Write for your free copy of the Klein Pocket Tool Guide today!
"Since 1857"

Mathias KLEIN & Sons
Established 1857 Chicago, Ill., U.S.A.
3200 BELMONT AVE., CHICAGO 18, ILL.

BULLETINS ETC.

(22) INSTRUMENT TRANSFORMERS—The 1954 edition of the Instrument Transformer Buyer's Guide is available from General Electric Co., Schnectady 5, N. Y. Containing the manufacturer's complete line, of indoor and outdoor potential and current transformers, the 96-page publication is designated GEA-4626G.

(23) UNDERGROUND DUCT—An installation manual, "How to Use Soapstone Oct-O-Duct—a manual of field practice," has been issued by Soapstone Duct Co., 110 Linfield Drive, Menlo Park, Calif. Based on field experience the first million feet of the new flat-sided underground conduit, the eight-page booklet illustrates methods of preparing trenches, erecting duct structures and manholes and encasing. It is designed for use by construction personnel as well as engineers.

(24) CATALOG—Johns-Manville, 22 E. 40th St., New York 16, N. Y., has issued a new edition of its 40-page Industrial Products Catalog.

(25) HEATING—A revised catalog of its electric heaters and controls has been prepared by Industrial Engineering & Equipment Co., 711 S. Theresa Ave., St. Louis 3, Mo.

(26) ALUMINUM CONNECTORS—Its recently developed line of massive aluminum power connectors for both aluminum and copper bus is described by Burndy Engineering Co. Inc., Norwalk, Conn., in a new 44-page catalog, AL55. Completely indexed, the two-color bulletin lists and illustrates 33 basic clamp- and compression-type connectors for aluminum, tube, cable and special bus shapes, as well as installation tooling and accessories. A 12-page technical section discusses electrical and mechanical principles.

(27) HANDBOOK—Uses and properties of aluminum for power and lighting wire are given in a handbook available from United States Rubber Co., Rockefeller Center, New York 20, N. Y.

(28) INDUSTRIAL LIGHTING—The A.L.S. industrial fluorescent fixture is described in a six-page folder released by Smithcraft Lighting Division, Chelsea 50, Mass.

(29) MANUAL—Time-saving techniques for making hot-line repairs and replacements are told in a 72-page spiral-bound pocket-size booklet offered for on-the-job use by James R. Kearney Corp., Department HF, 4236 Clayton Ave., St. Louis 10, Mo. Charts giving characteristics of all bare conductors are included. The manufacturer's Hi-Line tools and accessories are illustrated and described.

(30) METHODS—A folder entitled "Four Steps to Better Products," covering its recently expanded departments, has been published by Delta-Star Electric Division, H. K. Porter Co. Inc., 2437 Fulton St., Chicago 12, Ill. It depicts steps of production from engineering through designing, testing and manufacturing.

(31) TIME SWITCH—The new type B time switch, NEMA standard 30-amp, single-pole, single-throw, steel-cased unit, is described in catalog sheet No. 1020 from Sangamo Electric Co., Springfield, Ill.

(32) DUCT—"Transite Ducts" is the title of a new 12-page brochure issued by Johns-Manville, 22 E. 40th St., New York 16, N.Y. It covers installation and maintenance data on Transite conduit, and Transite Korduct.

ELECTRICAL WEST ***Not good after April 1***
68 Post St., San Francisco 4, Calif.

Please send me, without obligation, the new product information or catalogs:

If described in Product News, circle item number

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29 30 31 32

If described in advertising, fill in page number

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

NAME..... TITLE.....

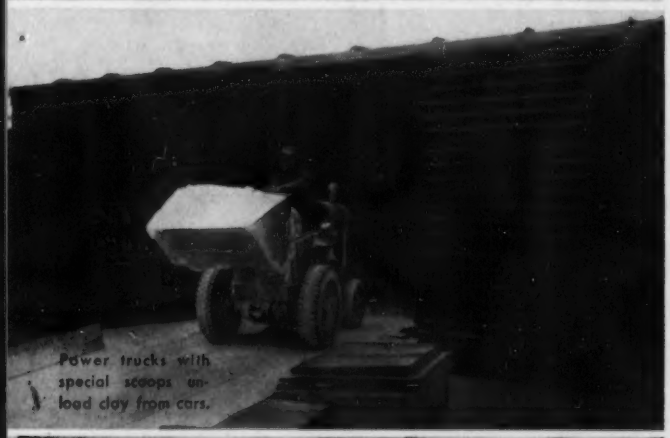
COMPANY.....

ADDRESS.....

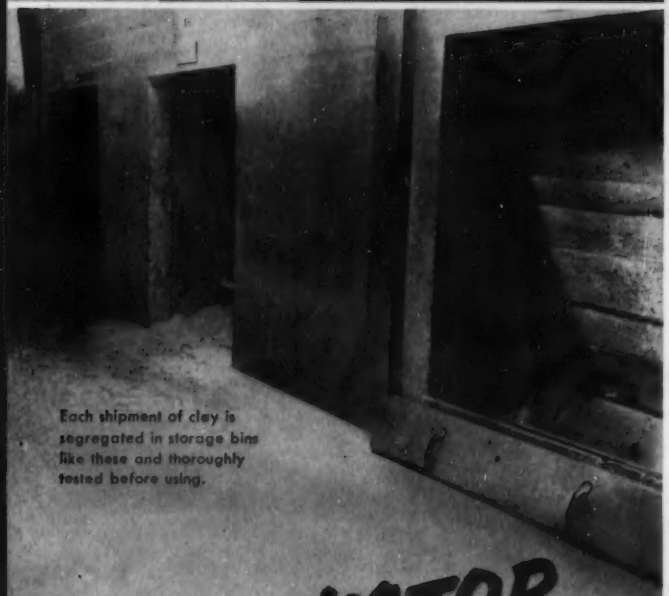
CITY..... ZONE..... STATE.....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

The world's finest ceramic raw materials come from the states shown in color. Victor uses them exclusively.



Power trucks with special scoops unload clay from cars.



Each shipment of clay is segregated in storage bins like these and thoroughly tested before using.

Specify **VICTOR**
PURIFIED PORCELAIN
INSULATORS

Another Reason Why—

VICTOR Makes Better Insulators

WE USE AMERICAN CLAY, FLINT AND FELDSPAR EXCLUSIVELY!

BETTER INSULATORS begin with better materials. Victor was the *first* to recognize the superior qualities of *American* clays and the advantages of closer control over sources of supply. That's why Victor *Purified* Porcelain insulators have greatest uniformity in mechanical and electrical strength values. For the whole story, send for our free Booklet, "The Story of Victor and Purified Porcelain."

VICTOR NO. 9
LOW VOLTAGE
PINTYPE

VICTOR INSULATORS, INC., VICTOR, N. Y.

Low and High Voltage Pintypes • Suspensions
Guy Strains • Spools • Switch and Bus Insulators
Custom Designed Porcelain

"We have used D-H MANGANIN for 25 years..."

DOUBLE-PURPOSE BRIDGE. This Shallcross Model 6320 Wheatstone Limit Bridge can be used both for exact resistance readings and, in production, for rapid checks on percent deviation from an accepted standard. Overall range extends from 0.1 ohms to 111,110,000 ohms. All resistors are D-H Manganin.

Says **SHALLCROSS MANUFACTURING COMPANY,** Collingdale, Pa.: "For 25 years we have been using Driver-Harris Manganin wire in the construction of Wheatstone and other precision bridges. In addition, D-H Manganin alloy has been used in many special standards for research and development laboratories. We feel that the quality of our products and the reputation of our instruments have been greatly enhanced by its use."

Behind statements like these stand Driver-Harris production and drawing techniques, which provide Manganin of such fixed stability that maximum change in resistance between 15°C and 35°C is only about 15 parts per million per degree centigrade—and frequently *less than one-third this* amount. Equally good electrical characteristics are available for ammeter shunt stock operating between 40°C and 60°C.

The experience of Shallcross reflects the experience of a host of manufacturers throughout the country; reflects what *you* can expect from Driver-Harris products, whether Manganin or any of the numerous alloys developed by Driver-Harris for application in the electrical and electronic fields.

Whatever your alloy problem, therefore, let us have your specifications. We'll gladly put at your disposal the skills acquired from 50 years of alloy manufacturing experience . . . make recommendations based on your specific needs.

*T. M. Reg. U. S. Pat. Off.

*Sole producers of world-famous Nichrome**

Driver-Harris Company

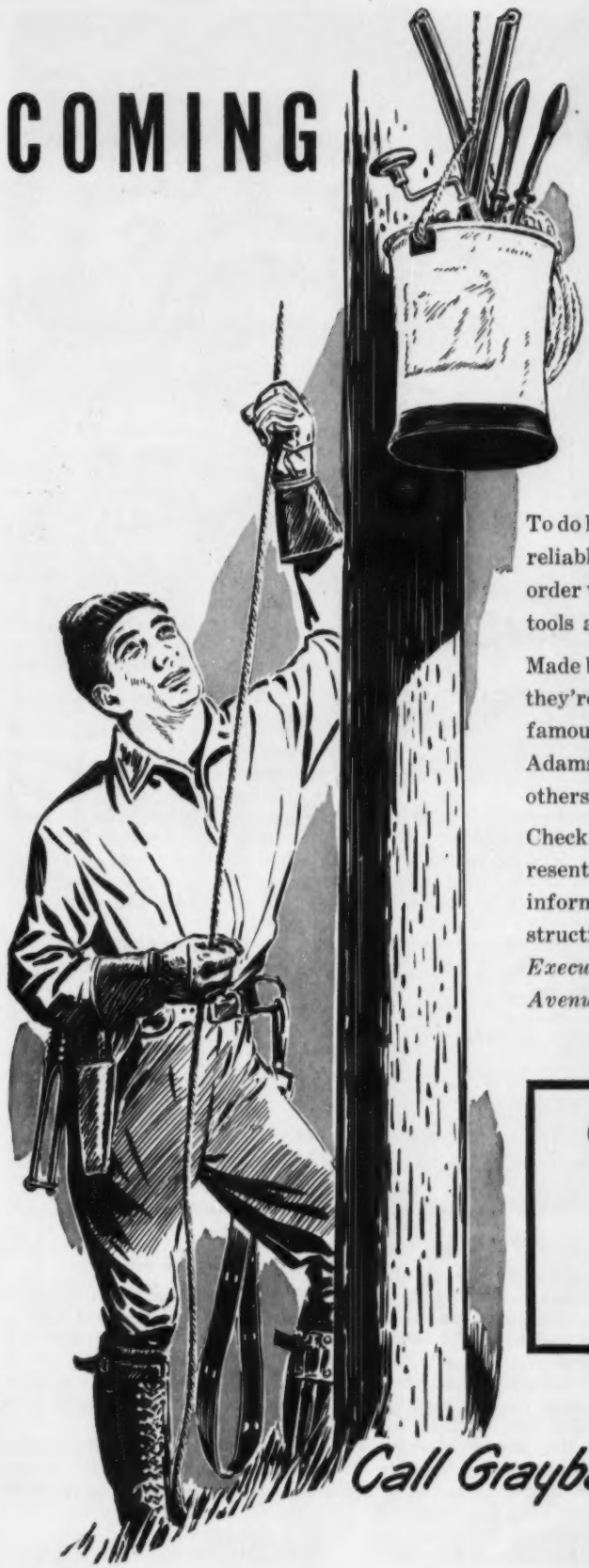
Western Representative: **ANGUS-CAMPBELL, INC.**

5320 Santa Fe Ave., Los Angeles 58 917 Bryant St., San Francisco 3

Main Office and Plant: HARRISON, NEW JERSEY

MAKERS OF THE MOST COMPLETE LINE OF ELECTRIC HEATING, RESISTANCE, AND ELECTRONIC ALLOYS IN THE WORLD

COMING RIGHT UP!



TOOLS... via Graybar

To do his job well, your lineman needs the finest and most reliable equipment obtainable. Make sure he gets it—order with confidence from the lines of carefully selected tools and supplies available from near-by Graybar.

Made by over 200 of the nation's leading manufacturers, they're all products your linemen know and respect—famous tool lines, for instance, like Klein, Simplex, Adams, Salisbury, Oshkosh, Coffing, Chance and many others.

Check your tool inventory with your local Graybar Representative. Remember, too, he's a convenient source of information on everything electrical for pole-line construction and maintenance. *Graybar Electric Co., Inc., Executive Offices: Graybar Building, 420 Lexington Avenue, New York 17, N. Y.*

310-82

Call Graybar for LINEMAN'S TOOLS

Belts • Bits • Blocks • Braces • C-hooks
Cable Grips • Cant Hooks • Chain Hoists
Clamps • Climbers • Come Alongs • Cradles
Gloves • Grips • Hoists • Jacks • Peavies
Rods • Rubber Safety Equipment • Torches

Call Graybar first for...

Everything Electrical Graybar Electric Company

IN OVER 100 PRINCIPAL CITIES

ELECTRA'S HUSBAND

UNITY AMONG THE PROFESSIONS?

"ACHIEVEMENT of greater unity in the engineering profession is a myth and a mirage. It won't come about until the individual engineer himself decides that he wants the same professional status and consideration that the doctor and the lawyer enjoy." The speaker was the president of one of the great national engineering societies. Four of us were lunching together a couple of weeks ago. Others were the dean of engineering of a Western university and the editor of a national engineering journal.

Argument had been hot and heavy. It had been ignited by the statement of the other editor, seconded by me, that failure of the National Society of Professional Engineers to affiliate with the Engineers Joint Council had given the cause of engineering unity a severe setback.

"NSPE can do all or most of the things that EJC is doing," the college dean said. "It is building greater professional unity right now. The so-called founders' societies can't do it through an agency that is as far removed from the individual engineer as the EJC."

"But EJC will speak with greater authority," I argued. "Through its constituent organizations it represents 150,000 engineers. NSPE represents but 30,000. Actually NSPE members have no more voice in what it does at the national level than do members in the AIEE, ASME or other societies comprising EJC."

"That's right," my contemporary agreed. "When a profession is as large and diverse as engineering, the form of organization set up to represent its members has little real significance. In the end, a small group of men, selected by any one of several possible methods, must act on matters that usually cannot be placed before each individual member. Consequently, the representative character of that group is more important than the method of its selection."

"It will come closer to asserting an opinion or taking a position that is in accord with grass-roots thinking when it is based on a three-level integrated organization like NSPE," the dean of engineering declared emphatically.

"You fellows overlook a lot of history," the society president pointed out. "Any council—not just EJC—has an existence that is shaky to say the least. It is subject to the whims of a few who can withdraw their support at any time and let the council fall flat on its face. I'm firmly convinced that if we engineers want a strong permanent organization to deal with problems of unity it will have to be based on the individual engineer and not on any coalition of societies. History will bear this out. Too many people on the boards of national societies get the view that they and their board are omniscient and omnipotent."

"Aren't you a little bit harsh on a lot of people who sacrifice much time and effort to serve these organizations?" the other editor asked.

"No, I'm just realistic," the president answered.

"Well it's my feeling," the editor continued, "that at the present time EJC is much more representative of the engineers of this country than the NSPE. Members of the joint council come from the governing boards of eight organizations covering every major field of engineering. Many NSPE members are numbered in the rolls of these societies."

"It seems to me that we are missing the point completely," the dean challenged. "What's the sense of a national professional organization if the professional concept is lacking. One of our aims in the universities is to indoctrinate our engineering students with a true sense of professional values —dignity, ethics, integrity, loyalty and importance. I must confess that we get little help and little acclaim for our efforts. How can anyone hope for national professional unity when there is lacking a true understanding of what constitutes real professionalism?"

"Now you're talking like an academician," I chided because I knew him well enough to risk his ire.

"So? Well tell me if there is anything academic about a question such as some of our senior students asked last week," he bristled. "They wanted to know if they wouldn't be better off financially if they joined one of the so-called professional unions rather than a professional society. I'd like to hear your answer to that question."

"The way our society ducks that subject they probably would be better off," the president observed.

"They wouldn't if they joined the NSPE," the dean continued. "That is one organization that is doing something about unions. Because of this it may supersede some of the founders' society branches and chapters on our campuses."

"If you'll let me, I'll try to sum this up so we can all go back to our jobs," the president proposed. "I think we'll all agree that the important link in a real professional society has to be the local or the county unit. Look at the medical societies and the bar association and you will find that this is true. The AMA and the ABA make a big noise sometimes but they get kicked in the teeth if they are not in line with the thinking of county and state bodies.

"The professional society—whether it be engineers, doctors or lawyers—is needed in my town and your town. It is needed less on the state-wide level and even less nation-wide. True, it must have a voice before national and state legislatures. However, the real building of a profession and its responsibilities begins right at home. Do you agree or am I crazy?"

All of us nodded our heads.

That evening at home I tried to interest Electra in a resume of our discussions.

"You're too professional for me as you are right now," she said acidly. "And that goes for some of your friends."

"Hold on," I countered. "You have no objection to doctors. They're professional men."

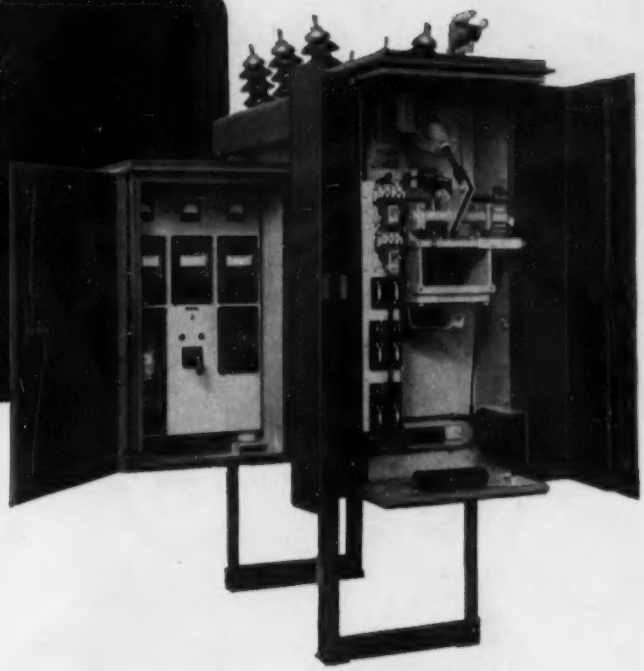
"That different," she replied archly. "Besides, they cultivate what you engineers could well spend some time learning."

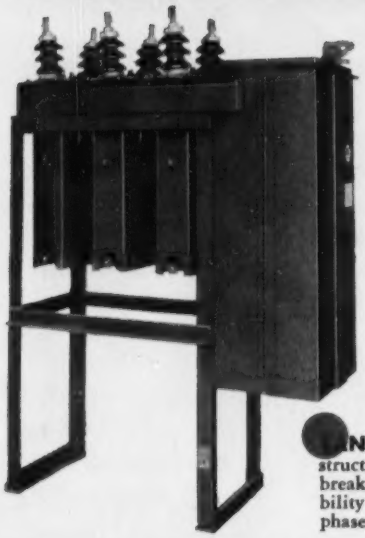
"And what is that?"

"A bedside manner."

Get the breaker with these PLUS FEATURES

Here's increased operating convenience with high safety factor

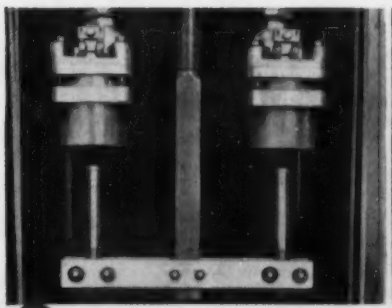


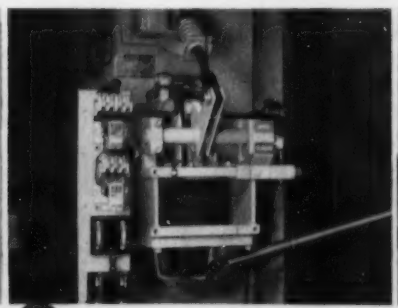


INK PER PHASE construction — as used in large breakers — eliminates possibility of internal phase-to-phase flashover.

CCESS FROM THREE SIDES. Side hinging of L-shaped doors allows side as well as front access to operator cabinet. Operator is high speed solenoid type — mechanically and electrically trip-free. Linkage is basically same as used on large A-C breakers.

O FALSE OPERATION of relays. Operate the breaker — slam the door — or let the wind slam it and relays can't operate accidentally. Relay panel is in separate cabinet from operating mechanism and is 4-point mounted on shock absorbers. No hinge wiring either! Separate door in rear of cabinet provides access to back of relays.





LIP AND BAYONET CONTACTS are self wiping, self aligning. Note also, double break per pole design and time-proved *Ruptor* interrupting device are used. Here again, Allis-Chalmers is using the same quality construction as is used on large A-C breakers.

SIBILITY PLUS. Maintenance closing device is side operated. Man closing breaker can observe contacts and man working on them. In addition, external position indicator easily visible at a distance from front or side. Inside position indicator also provided.

O BURIED LEADS. Simply remove three pins at bottom of fabricating wiring duct to expose bushing current transformer leads. No conduits, pipes, fittings to remove. This is just one more feature that makes this the outstanding distribution-type breaker today.

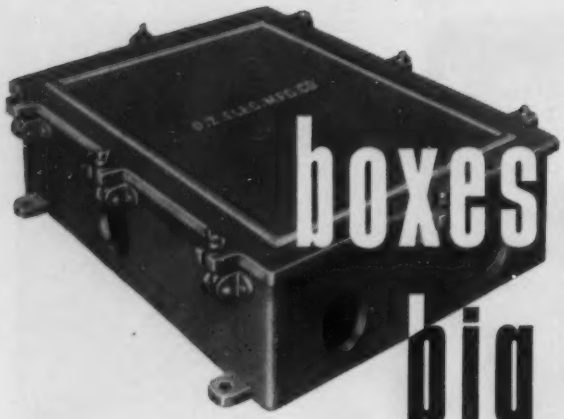
GET COMPLETE INFORMATION. Call your nearby A-C district office, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4255

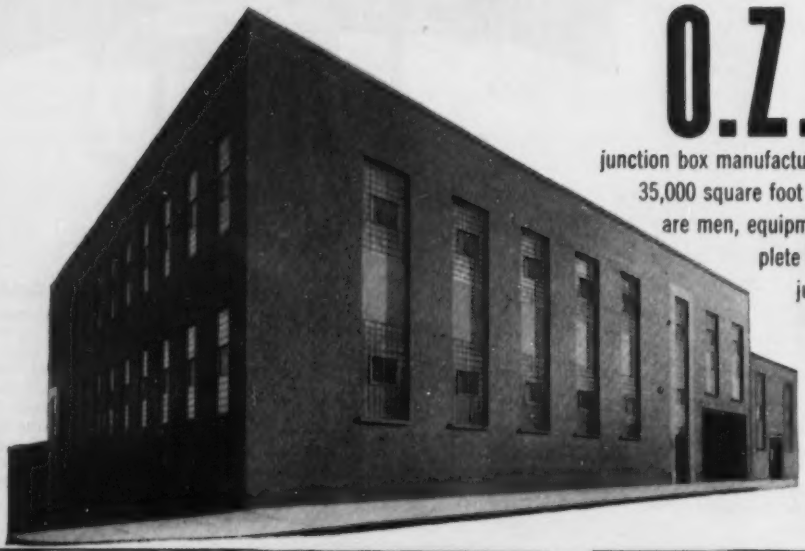
Ruptor is an Allis-Chalmers trademark.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS



boxes are big business at O.Z...



So big, in fact, that our junction box manufacturing facilities are located in a new 35,000 square foot plant. Here, in a modern building, are men, equipment and space to fabricate a complete line of surface and flush-mounting junction boxes for every application and requirement. A large stock is maintained at all times for speedy delivery. Your O. Z. distributor is now in a better position than ever to fill your needs.

Modern equipment for fabricating junction boxes in this O. Z. box plant means greater efficiency for us . . . better service for you.

Greatly increased stock assures a constant supply of standard junction boxes and speedy processing of your orders.

O.Z. ELECTRICAL MANUFACTURING CO., INC.

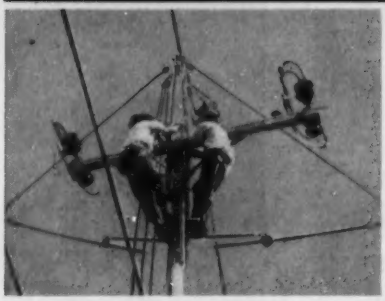
262 BOND ST. • BROOKLYN 2, N. Y.

CAST IRON BOXES • SOLDERLESS CONNECTORS
CABLE TERMINATORS • GROUNDING DEVICES
POWER CONNECTORS • CONDUIT FITTINGS

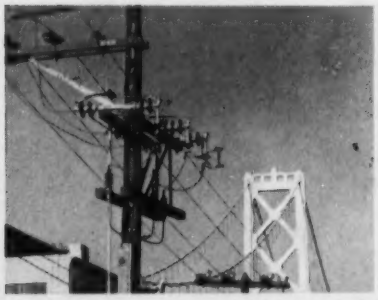
KPF

AIR BREAK SWITCHES

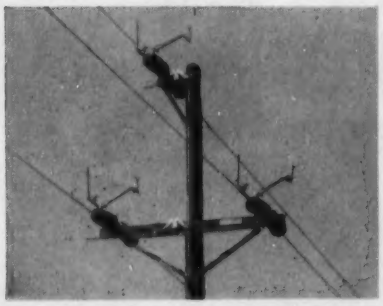
Standard for nearly half a century



Installing KPF Type A-202 switch hot on 12 kv line. KPF phase units are shipped completely assembled, ready for quick installation.

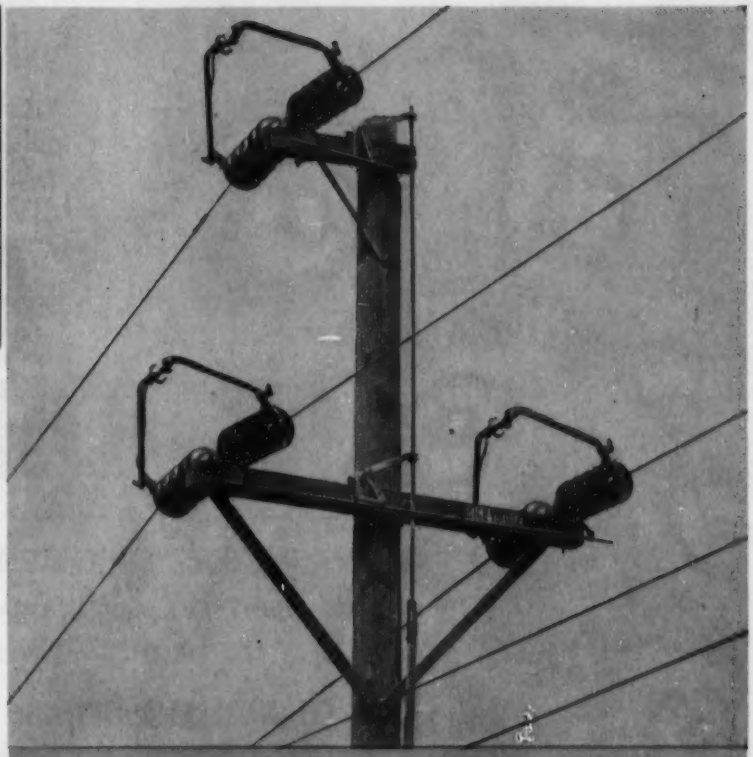


Horizontal-mounted KPF Type UF-2 switch in metropolitan service (P.G.&E., San Francisco). Versatile KPF switches operate equally well with or without line tension.



KPF Type S-205 switches with inexpensive Quick-Break attachment on 60 kv rural transmission line. Switch shown in open position.

2820



Basically different switch design proven in decades of service with leading utilities

Service-proved KPF switches look different because they *are* different.

Their simple, sturdy design insures freedom from mechanical failure or lubrication worries, and virtually eliminates maintenance. Self-aligning silver surfaced blades operate smoothly despite severe ice or crossarm warpage conditions. Installation is fast and economical—switches are bolted directly to crossarms on the ground or in the air. No separate strain insulators or extra crossarms are required; integral insulator stacks readily adjust to line sag.

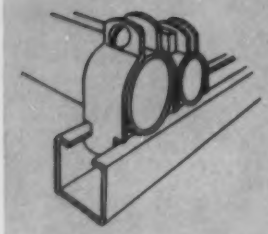
KPF switches have been used for almost 50 years on lines ranging from 7.5 to 110 kv. Tens of thousands are in use today by Pacific Gas & Electric, Southern California Edison, Minnesota Power & Light and other leading power companies throughout the world.

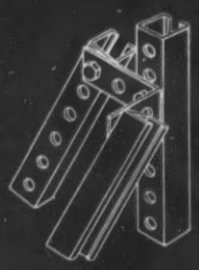
For the world's simplest, surest, lowest cost air break switch, specify KPF—standard for nearly 50 years.

New catalog gives complete specifications, detail drawings, installation information.

KPF ELECTRIC COMPANY

1624 East Alpine Avenue, Dept. W-1, Stockton 5, California

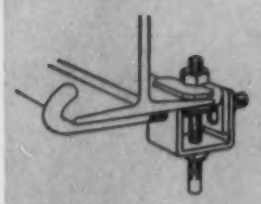
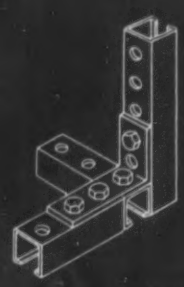
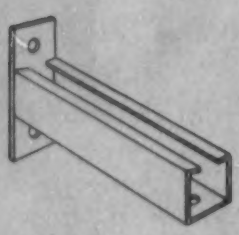
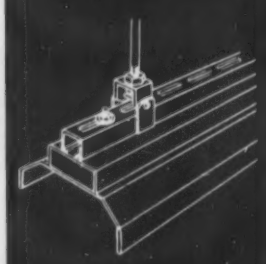




KINDORF

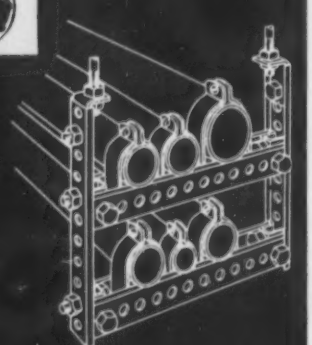
CLAMPS, HANGERS, CONCRETE INSERTS
For Supporting Conduit, Lighting Fixtures and Electrical Equipment

CHANNEL AND FITTINGS
For Racks, Framing and Shelving

SOLD THROUGH ELECTRICAL WHOLESALERS
for Engineering Assistance, Contact Sales Representative or Write

STEEL CITY ELECTRIC CO.
PITTSBURGH 33, PENNSYLVANIA
ELECTRICAL BOXES AND CONDUIT FITTINGS
KINDORF DEVICES FOR INSTALLING CONDUIT
50th YEAR



ELECTRICAL INSULATION IS OUR SPECIALTY

Q. *What ONE wire and cable producer grows its own natural rubber, and makes its own synthetic rubber?*

A. UNITED STATES RUBBER COMPANY.

Q. *What ONE wire and cable producer makes plastics?*

A. "U. S."

Q. *What is the most important part of wire and cable?*

A. The insulation.

Q. *Who is best equipped to make wire and cable with superior insulation?*

A. U. S. RUBBER—which grows its own natural rubber, makes its own synthetic rubber, manufactures its own plastics.

Tapping rubber from one of the millions of trees on U. S. Rubber's giant plantations in Malaya.

Isn't it logical that a rubber company should make the best wire and cable insulation there is? U. S. Rubber has been a pioneer in insulation for over 70 years—has amassed in that time a stockpile of research data and experience that can't be beat. Electrical insulation is a "U. S." specialty!

Electrical insulation makes the difference between superior and ordinary wire and cable. Conductors of all manufacturers are standard, but insulation must be the best that science can produce. That's why your best bet in wire and cable is U. S. Rubber.

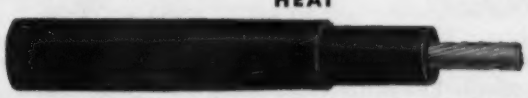
SOME MORE OF THE MANY DIFFERENT VARIETIES OF "U. S." WIRE AND CABLE

UTILITIES: Power Cables · Street Lighting · Royal Cords · Network Cables · Utility Control · Pole & Bracket Cable · Service Entrance · Weatherproof · Zip Cord Pole Fixture Cable · Sup. Control

RAILROADS: Power Cables · Communications · Railway Signal · Royal Cords · Welding Cable · Railway Utility · Sup. Control · Weatherproof

HEAVY INDUSTRY: Power Cable · Royal Cords · Welding Cables · Control Cables · Machine Tool Wire · Building Wire · Switchboard Wire · Thermostat Cable · Bus Drop Cable

OZONE Absolute Tops in MOISTURE Resistance HEAT



U. S. RUBBER'S BUTYL-INSULATED POWER CABLES

These cables are for use on power distribution, street lighting and station control circuits and for general-purpose wiring on circuits up to 8000 volts between phases and at conductor temperatures up to 80 C. The insulation will not crack after four hours in air containing 0.015 per cent ozone. They are light in weight, easy to install and join, and are resistant to oil, heat, sunlight, flame, acids, alkalies and corrosive chemicals. The following are guaranteed test values:

PHYSICAL AND AGING PROPERTIES (MINIMUM VALUES)

	Butyl Insulation			Neoprene Jacket	
	Unaged	After 168 Hrs. in O.B. at 80 C.	After 7 days in Air Oven at 250 F.	Unaged	After 96 Hrs. in O.B. at 70 C.
Tensile, lbs. per sq. in.	600	500	400	1800	1600
Elongation, per cent	400	350	350	300	250

MOISTURE RESISTANCE (MAXIMUM VALUES)

a. Dielectric constant and power factor of insulation after immersion in water at 50 C.

Dielectric constant, one day	4.0
Per cent gain, 1 to 14 days	2.0
Per cent gain, 7 to 14 days	1.0
Power factor, one day, per cent	2.0

b. Mgs. per sq. in., 7 days at 70 C. 15.0

U.S.RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

ELECTRICAL WIRE & CABLE DEPT. • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

AVAILABLE DRAWINGS WERE VITAL IN CUTTING MANUFACTURING TIME TO 51 DAYS FOR THIS 20,000 KVA TRANSFORMER FOR LOUISVILLE GAS & ELECTRIC.

Emergency in Louisville demonstrates how—

Standardization cuts vital engineering time

Duplicate design slashes details, enables G.E. to build 20,000 kva transformer for L.G.&E. in record 51 days

Growing use of standardized, pre-engineered equipment is one of today's most significant trends in the utility industry. More and more companies are taking advantage of the benefits inherent in standardization—especially in medium transformers where savings of as high as 75 percent in engineering man-hours and 90 percent in drafting time contribute to an approximate 8 percent reduction in price and faster delivery.

AVAILABLE DRAWINGS SAVE 8 WEEKS

A dramatic demonstration of the scope and the importance of such time savings was the recent emergency at Louisville Gas & Electric Company where a 20,000 kva power transformer was destroyed by external explosion. Normal manufacturing time for a replacement unit would have been 52 weeks. However, with engineering and manufacturing drawings available from the original unit, a duplicate transformer requiring no engineering and almost no drafting was rushed to completion in 51 days. Since available drawings eliminated the need for 8 weeks of preliminary engineering, manufacture started immediately, using 1,000 employees working round-the-clock.

Although Repetitive Manufacture has not been extended to transformers of this size, this example does serve to demonstrate the contribution which standardization can make to the industry.

ENGINEERING AND DRAFTING TIME is virtually eliminated in standard units. Lynn Wetherill, Manager of Power Transformer Engineering (left) and W. S. Ginn, General Manager of Power Transformer Dept., examine standard drawings for a typical 5,000 kva RM power transformer.

ROME PLANT EXTENDS BENEFITS

And as part of its program to broaden and extend the benefits of standardization still further, General Electric is presently completing a $25,000,000 plant at Rome, Ga., for producing RM (Repetitive Manufacture) transformers from 501 to 10,000 kva.

If you believe additional opportunities for cost and time saving applications of standardized transformers, substations and structures exist on your system and would like more information, contact your local Apparatus Sales Office or write Sec. 301-250, General Electric Co., Schenectady 5, N. Y.

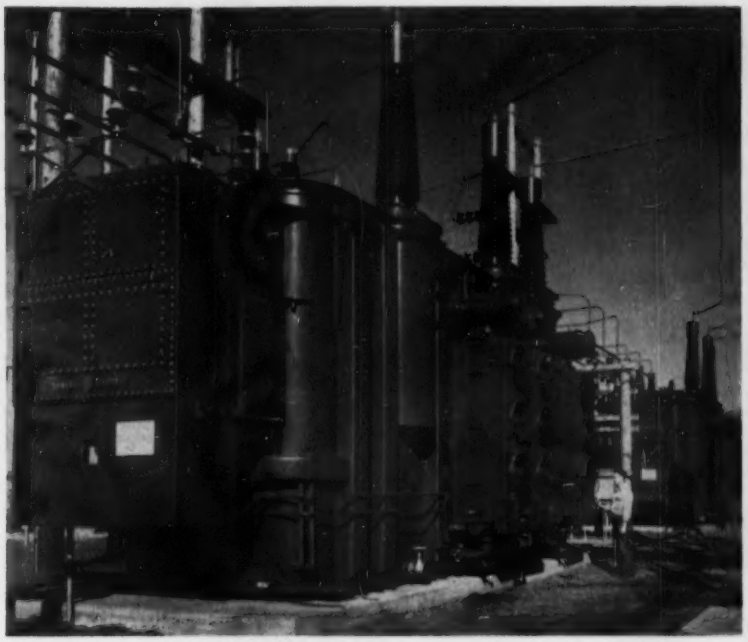
MORE POWER TO AMERICA

GENERAL ELECTRIC

ELECTRICAL WEST
SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

There Is No Letup In Sight for

Western Expansion



This transformer bank, installed by Washington Water Power Co., was part of more than 5,000,000 kva of power transformer capacity installed in the West in 1953

Leaving behind another record-breaking year, the electrical industry in the 11 Western states is confronted with challenges and opportunities that can make 1954 the best year in history. Many gages of growth point to that fact. New industries, new people, newly developed natural resources and new markets continue to spur electrical development to new records.

Here are some significant growth statistics: Electrical usage is expanding at a rate almost half again greater than the national figure. In 1953 the utilities of this region produced 14.5% more electric energy than in the preceding year. For the U. S. the increase was only 10%. New capacity added by utilities and government agencies totaled 1,349,167 kw. This is 15.2% of the total for the country as a whole. Utilities are backing their faith in the future with money. Last year they spent $490,664,050 for new facilities. The federal government's power facility spending reached $264,819,000. The total—$755,483,050—is more than 20% of the national expenditures for new electrical facilities.

But figures for 1954 are even more impressive. New capacity additions will reach an all-time high. A total of 2,339,134 kw is expected to come onto the lines. Expenditures will be up also. Utility budgets total $518,065,077 and federal appropriations for power are $215,991,000.

Full impact of what the war and postwar growth in population and industry has done to the electrical industry of the region is only evident when one examines some of the gages of expansion. Between 1940 and 1953 generating capacity increased 131%; kilowatt-hours generated expanded 220%; utility construction expenditures in 1953 were 373% greater than in 1940. Other indices bear out this growth. Personal income in the 11 Western states jumped 292% in the same period. Steel manufacturing capacity is now 400% greater than it was in 1940. 1953 building permits were 319% higher than in the earlier year.

Construction expenditures have a bearing on electrical prosperity especially for manufacturers, wholesalers and contractors. For them 1953 was a banner year. Almost 25% of the 1,075,000 new homes built in the U. S. were in the Western states. This made 1953 the second best year in the history of the region. A predicted 10% fall-off for 1954 will still leave construction expenditures at high levels. In a sampling of engineering and architectural firms to determine 1954 prospects, our McGraw-Hill contemporary, *Engineering News-Record*, found that a representative group of Far Western firms had on the boards $322,000,000 of new work—32% more than at the same time last year.

On the appliance side 1954 presents plenty of problems, biggest of which is the certainty that salesmanship will be required to induce customer purchasing. Last year saw appliance sales at record levels. Some 72 Western utilities with 5,605,205 domestic customers reported appliances sales in their territories of $673,000,000. They think this volume can be equaled again if the sales and promotion job measures up to the opportunities.

The facts and figures summarized here are spelled out in detail in the statistics and individual utility reports in the pages that follow.

Table I—Comparison of National to Western Operations for 1952 and 1953

	11 Western States		United States		Per cent West to U.S.	
	1952	1953	1952	1953	1952	1953
Energy generated (thousands of kwh)	77,987,143	89,199,701	398,924,551	483,118,118	19.5	20.3
Energy generated in hydro plants (thousands of kwh)	60,540,061	62,902,906	104,999,211	104,721,417	57.7	60.1
Energy generated in fuel plants (thousands of kwh)	17,347,082	26,396,795	293,925,340	333,396,701	5.9	7.9
Percentage of hydro to total generated	77.5	*70.6	26.4	23.9	...	...
Installed generator capacity (kw)	15,364,000	16,331,000	82,117,000	88,617,609	18.7	18.4
Installed hydro generator capacity (kw)	9,943,000	10,519,000	20,409,000	21,649,117	48.7	48.6
Installed fuel generator capacity (kw)	5,421,000	5,811,000	61,708,000	66,968,492	8.8	8.7
Revenue from energy sales (thousands of dollars)	843,947	969,824	6,137,272	6,800,000	13.8	14.2

Sources: Generation and capacity, Federal Power Commission; revenue, Edison Electric Institute. 1953 estimated on 11 months' operations.

Table II—Ten-Year Generation Record for Western Public Utilities (in thousands of kwh)

	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953*
Arizona	3,770,667	3,435,988	2,823,650	2,769,495	3,282,118	3,434,189	3,489,309	3,960,041	6,344,000	5,798,334
California	15,887,456	15,943,740	17,313,659	19,441,429	20,286,893	22,112,191	24,835,775	29,375,692	29,251,000	34,445,020
Colorado	1,136,831	1,128,655	1,168,151	1,375,653	1,592,067	1,630,959	1,855,610	2,263,192	2,316,000	2,638,058
Idaho	1,233,764	1,263,032	1,334,914	1,507,474	1,622,107	1,840,226	2,537,648	2,915,242	3,729,000	3,891,317
Montana	2,459,781	2,318,130	2,465,805	2,764,383	2,869,825	2,915,361	3,136,251	3,303,612	3,780,000	3,717,767
Nevada	3,244,462	2,590,404	2,488,076	2,908,189	3,607,239	3,591,363	3,210,425	2,547,243	3,568,000	2,434,757
New Mexico	511,165	556,892	604,992	753,897	845,696	910,885	1,014,453	1,171,878	1,357,000	1,528,968
Oregon	4,785,539	4,183,748	4,148,566	5,456,577	5,433,228	5,291,441	5,544,548	5,975,489	6,661,000	6,592,553
Utah	436,943	416,956	457,169	562,198	600,208	614,598	658,571	824,318	1,113,000	1,499,998
Washington	10,311,897	9,689,862	9,038,842	11,230,994	13,881,239	15,079,298	17,370,986	19,914,385	19,463,000	21,923,633
Wyoming	255,575	263,403	315,898	325,684	388,656	506,207	594,812	638,386	865,000	825,968

FPC reports *12 months ending November

Table III—Type and Capacity of Generators, November 1953

Division and State	Number of Utilities	Number of Plants	Total Capacity Kilowatts	Generator Capacity in Kilowatts of Plants Operated by: Water Power Number	Water Power Capacity	Steam Power Number	Steam Power Capacity	Internal Combustion Engines Number	Internal Combustion Engines Capacity
Arizona	15	45	1,325,386	13	980,080	10	277,950	22	67,356
California	20	167	6,652,438	126	2,856,287	30	3,751,025	11	45,126
Colorado	39	77	644,651	26	143,397	24	467,873	27	33,381
Idaho	13	51	741,084	43	736,180	1	400	7	4,504
Montana	10	28	819,644	18	744,970	5	71,968	5	2,706
Nevada	7	16	595,888	9	586,180	...	.....	7	9,708
New Mexico	18	35	353,142	4	24,910	13	283,972	18	44,260
Oregon	18	69	1,039,899	50	834,719	12	198,710	7	6,470
Utah	25	82	358,133	59	94,155	6	237,500	17	26,478
Washington	20	56	3,611,962	41	3,411,036	8	196,820	7	4,106
Wyoming	23	49	188,421	18	107,397	11	69,320	20	11,704
11 Western States	208	675	16,330,648	407	10,519,311	120	5,555,538	148	255,799
United States	1,469	3,691	88,617,609	1,410	21,649,117	1,040	64,805,751	1,241	2,162,741

Source: Federal Power Commission

Table IV—Power Company, Municipal, State and Power District Systems Construction Expenditures — 11 Western States Compared With U. S.

Year	U.S.	11 Western States	Per Cent West to U.S.	Year	U.S.	11 Western States	Per Cent West to U.S.
1941	653,148,000	78,000,000	11.9	1948	2,078,088,000	375,000,000	18.0
1942	455,975,000	73,000,000	16.0	1949	2,517,614,000	422,000,000	16.8
1943	306,236,800	83,470,000	27.3	1950	2,347,171,000	362,519,000	15.4
1944	340,284,000	70,000,000	20.6	1951	2,443,324,000	425,195,556	17.4
1945	408,992,000	69,000,000	16.9	1952	2,901,250,000	491,315,000	16.9
1946	718,169,000	105,000,000	14.6	1953	3,187,489,000	490,664,050	15.4
1947	1,372,145,000	254,332,455	18.5	1954*	3,271,508,000	518,065,077	15.8

* Budgeted

1953 Record 1954 Outlook

Production Electrical energy production in the 11 Western states for 1953 was 89,199,701 kwh. This compares with 77,987,143 kwh for 1952, an increase of 14.4%. This compares with an adjusted increase of 9.2% for 1952. Generation for the West was 20.3% of the U. S. total, an increase of .8% over the previous year. In 1953 hydro generation in the West was 60.1% and thermal generation 39.9% of the total. In 1952 hydro generation was 57.7% of the total.

Capacity Total installed capacity of power plants in the West was 16,831,000 kw as of November 1953, according to FPC figures. This is an increase of 14.6% over the capacity figure of 14,681,701 kw for 1952. During 1953 there were installed 1,349,167 kw of new plant capacity. Of this 595,000 kw were steam capacity and 754,167 kw hydro. Planned for 1954 are 2,399,134 kw; 1955, 2,237,250 kw.

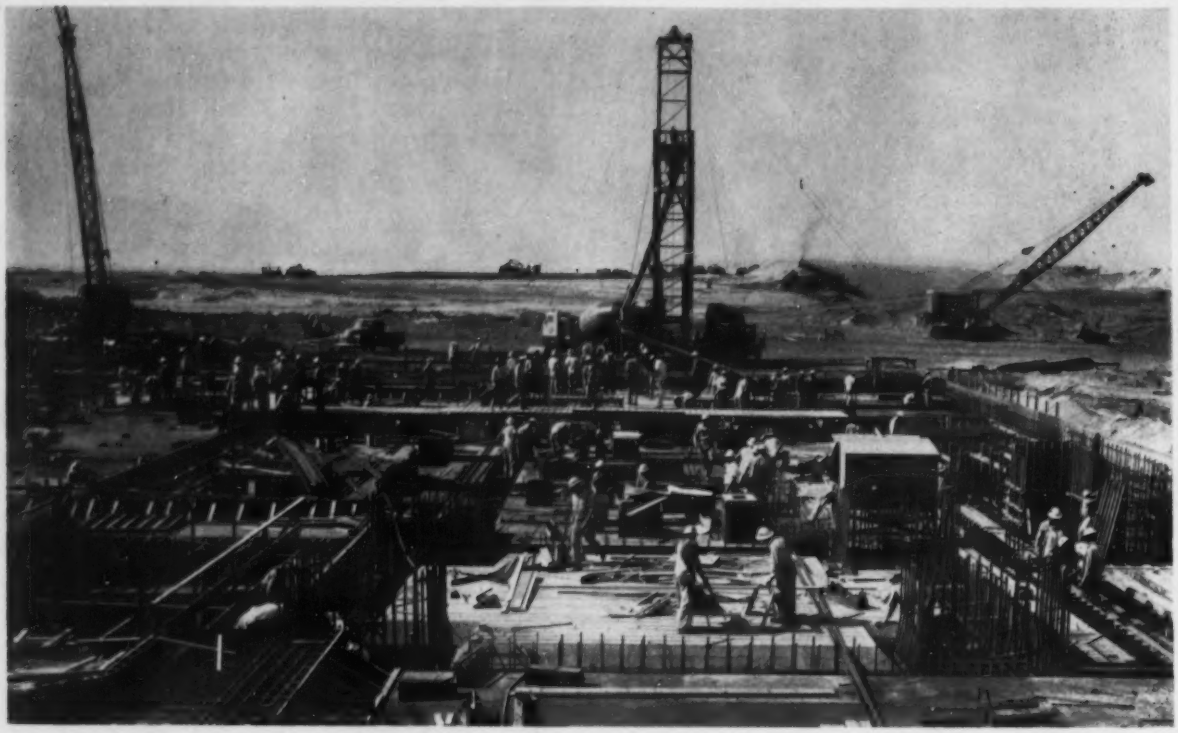
Expenditures During 1953 Western utility systems, exclusive of federal, spent $490,664,050 as compared with a budget of $490,798,000 reported a year ago. For fiscal 1953-54, federal agencies—USBR, Army Engineers and BPA—had an additional $264,819,000 to spend.

Construction Engineering awards for construction in the West were slightly less in 1953 than the year before, being $2,059,720,000 as compared with $2,187,097,000 for 1952. These figures indicate a continuance of the tapering off of heavy construction since the peak year of 1951. However, the decline is small and there is no indication of what could be called a major curtailment in heavy construction. For the 11 Western states new urban dwelling units authorized for the first 10 months of 1952, and 1953, as reported by the Bureau of Labor statistics are: 1952, 120,398 units with valuation of $954,542,000; 1953, 116,328 units with valuation of $949,091,000. This indicates a slight slackening of residential building activity for 1953 as compared to the year previous. For 1954, one governmental agency unofficially estimates that residential building in the West will maintain about the pace set in 1953 or at most will not decline more than 2 or 3%.

Budgets Budgeted for 1954 by nonfederal agencies of the West are $518,065,077. For the first time the combined budget for Western utilities has exceeded the half-billion mark. Federal agencies have budgeted for fiscal 1954-55 another $215,991,000. The nonfederal budget is up 7.2% over expenditures for 1953. Interestingly enough, this closely parallels the 8.35% increase in combined annual peak demand for Western systems during the past year.

Appliances Although selling against a more saturated market all predictions, based on increased selling programs, promotions, shows, etc., indicate 1954 sales will about equal those in 1953, which totaled: 350,000 washers, 75,000 dryers, 265,000 refrigerators, 50,000 freezers, 125,000 ranges, 37,000 water heaters, and over 700,000 television receivers to the 11 Western states' 6,250,000 domestic and rural customers. Kilowatt-hour consumption per residential customer is high, running from 2,000 to 7,500 annual average, many customers individually using more than 10,000. In the statements of most utility executives there is promise of intensified selling effort through cooperative programs with dealers for 1954, the block of power shortage having been removed. Intensified effort will be exerted toward home rewiring to remove that obstacle to sales and use. It will be a year of hard selling.

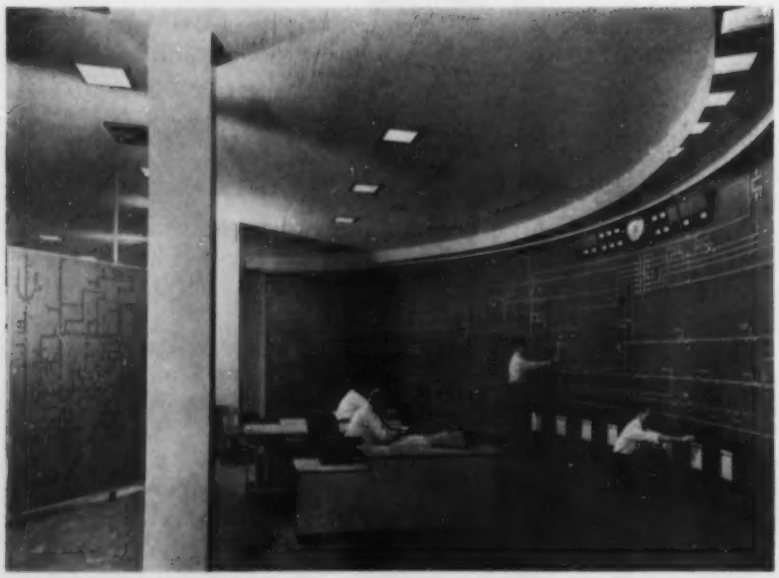
Customers Western utilities served a total of 7,315,645 customers at the close of 1953. During 1953, 295,749 customers were added for a gain of 4.21%. Totals in the 11 Western states in various classifications were: residential, 6,039,124; rural, 225,663; small light and power, 955,568; large light and power, 66,837. State totals in all classifications: Arizona, 241,917; California, 4,231,741; Colorado, 470,015; Idaho, 207,028; Montana, 199,142; Nevada, 63,002; New Mexico, 196,001; Oregon, 553,964; Utah, 218,754; Washington, 839,718; Wyoming, 94,363.



Morro Bay steam plant of Pacific Gas and Electric Co. is well under way. First of two 150,000-kw units is scheduled for spring 1955

Western Utilities Will

Load growth of 8.35%



New practice in dispatchers' boards was used here by the Portland General Electric Co.

Spending for Betterments by Western utility systems in 1954 will be up 5.6% over expenditures during 1953, passing for the first time the half-billion mark. Total budgeted for 1954 is $518,065,077. This compares to actual expenditure for 1952 of $490,-664,050. Federal agencies have less to spend for fiscal 1954 than the year previous. Appropriated for the Bureau of Reclamation, Army Engineers and the Bonneville Power Administration for fiscal 1954 is $215,991,000. This compares with $264,819,000 for 1953 and indicates a slight tightening of the federal purse strings for Western power development.

Annual Peak for all Western systems for 1953 was 17,001,385 kw, an increase of 1,307,732 kw, or 8.35%.

New Generation added during 1953 totaled 1,349,167 kw. Of this 595,000 kw were steam and 754,167 kw hydro. For 1954, additional generation

Hungry Horse power plant, USBR (left) has four 71,250-kw generators. Right: Public Service of Colorado reconductors 115-kv line

Increase Spending in '54

for 1953 calls for three-quarters of a billion to be spent this year in the West

to come in will total 2,399,134 kw.

New Steam generation will account for 1,623,250 kw of this, greatly exceeding the hydro planned, which is 775,884 kw. Thus for the first time steam will exceed hydro, and by almost exactly two to one. This reflects the growing importance of steam power generation in the Far West. All of this steam capacity is being built in the Pacific Southwest and the Rocky Mountain region—the Pacific Northwest still remaining exclusively hydro.

New Transmission planned for 1954 totals 2,680 line miles. This is slightly greater than the 2,598 miles of line built during 1953. Of new lines to be built this year, federal agencies account for only 849 miles. In 1953 the same agencies built 972 miles.

Distribution Line Mileage planned for 1954 is 5,580. Last year 6,480 miles of new distribution were reported.

Transmission Substation Capacity planned for 1954 totals the surprising figure of 5,335,125 kva. This compares with 3,644,840 kva for last year.

Capacity in Distribution Substations scheduled for this year is 1,993,190 kva. In 1953, 1,843,312 kva were added.

In the pages that follow will be found statements by federal and nonfederal agencies reviewing major construction completed during 1953 and that planned for 1954.

Federal

Army Engineers

The many large multipurpose power projects now under construction in the Pacific Northwest by the U. S. Army Engineers will be found listed under the states in which they are located.

Bonneville

Report of the Bonneville Power Administration is on page 102.

REA

REA made electrification loans of $26,733,500 to its borrowers in eleven Western states during the calendar year 1953 for construction of more than 6,000 miles of new line serving an estimated 20,605 rural consumers. The cumulative total of REA loans approved to these states is now $315,801,564.

REA-financed electric systems continued to expand, adding nearly 10,000 miles of line and 26,000 consumers in 1953.

More than 93% of all farms in the

eleven-state area are now electrified, compared with 90.8% for the entire nation. Washington, with 99.1% of its farms connected to power lines, leads all Western states.

The number of unelectrified farms on July 1, 1953, was 31,645, down more than 12,000 from the July 1, 1952, estimate of 44,000. More than three-fourths of the unelectrified farms are located in four states—California, 7,995; New Mexico, 6,492; Montana, 5,269, and Colorado, 4,519.

Tabulations showing the relative status of REA borrowers appear on pages 90 and 91.

Bureau of Reclamation

Reports on status of Western USBR projects will be found listed under the states in which they are located. A table will be found on page 85 showing current and future bureau power projects. The comprehensive transmission line construction program of USBR will be found on page 84.

Arizona

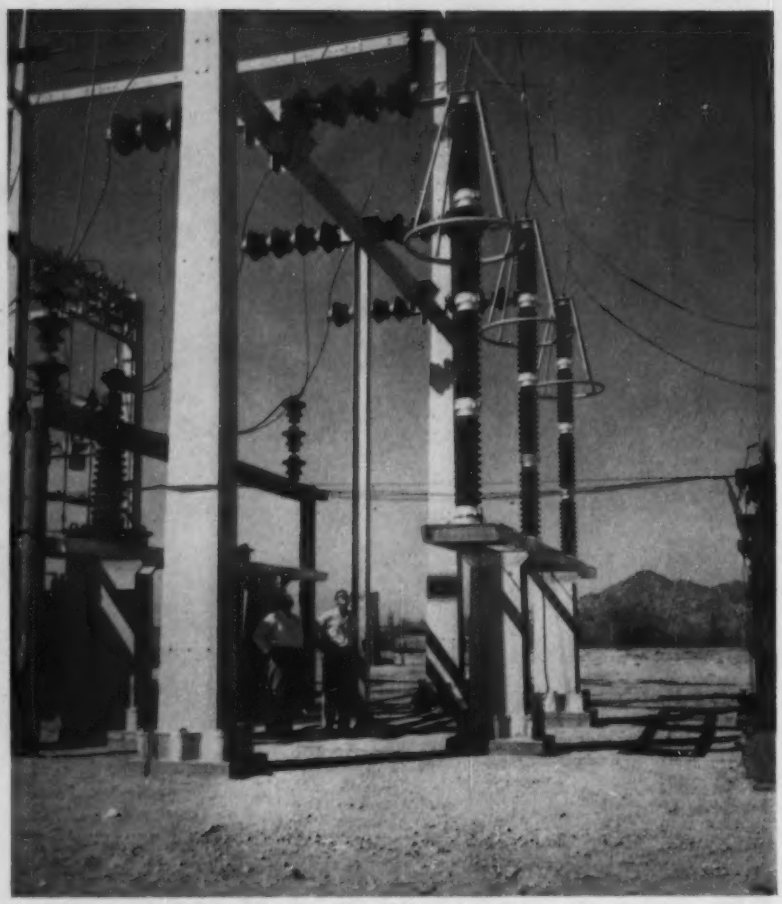
Arizona Public Service

Arizona Public Service Co.'s load still continues to increase. The peak of 301,000 kw reached in 1953 was approximately 8.7% over 1952. The 50-year trend of load increase for the company has been at the 12½% level.

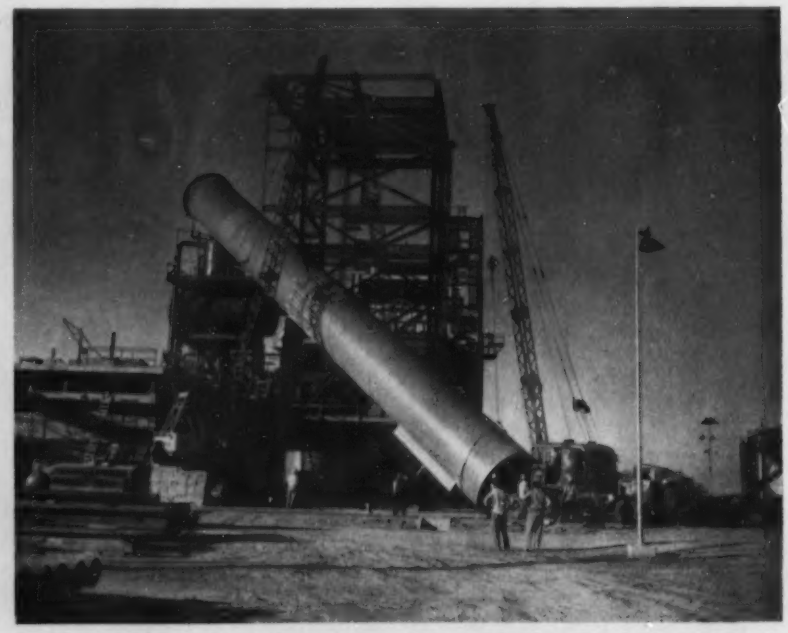
One of the major projects in construction is the Saguaro 200,000-kw power plant started about one year ago. Construction is progressing on schedule, the first 100,000-kw unit is expected to be in commercial operation by June 1, 1954; and the second 100,000-kw unit by the same date in 1955. The plant is a complete outdoor installation. It is located on the desert approximately 30 miles northwest of Tucson. Plant design is for four units but only two are being installed in the initial development. The plant will deliver its power to the 115-kv transmission system in the area, moving power to the various agricultural areas and towns in south central Arizona.

Plans are already under way for another outdoor plant, named the Ocotillo plant, in the Phoenix area. General arrangements provide for ultimate installations of four units, initial installation calls for a 100,000-kw unit. Construction will start in midsummer of 1954 with completion set for the second quarter of 1956.

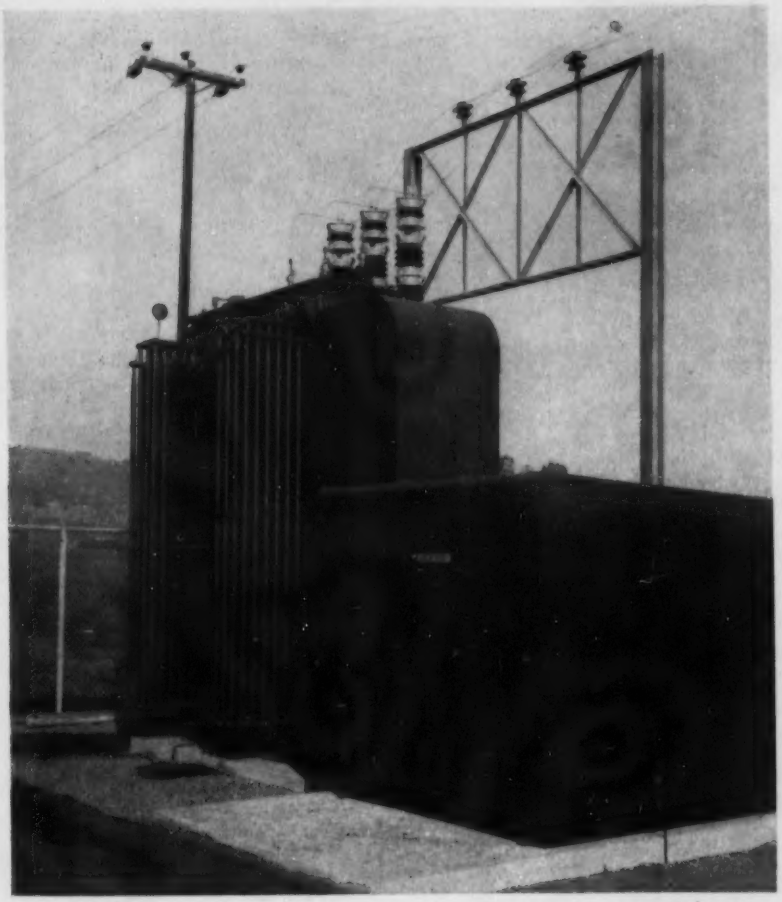
Another major 1953 project was the construction of approximately 21 miles of 115-kv transmission line and ter-



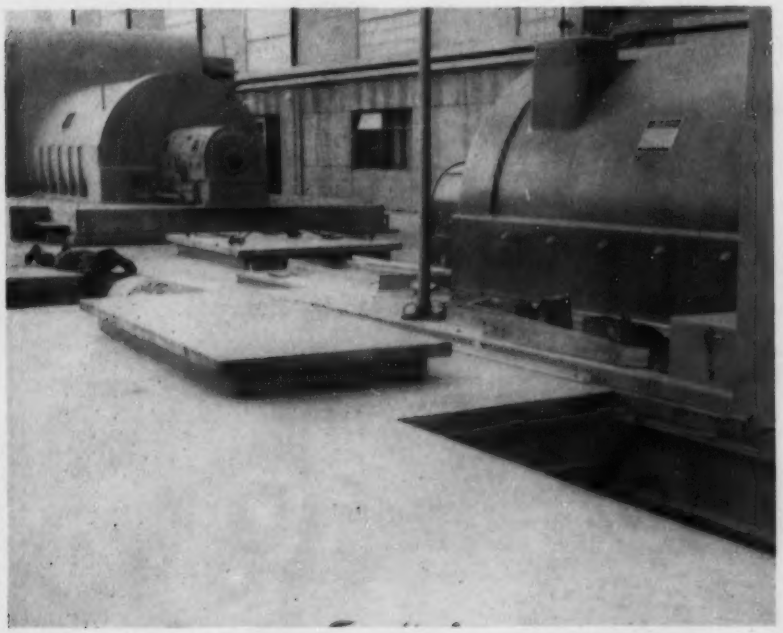
Here is a new semirigid box-type substation structure used by Arizona Public Service



Stack goes up for addition to Kyrene steam plant of Salt River Power District, Phoenix



Mission 3,750-kva unit sub installed at Santa Cruz by Coast Counties Gas & Electric



Outdoor turbine deck where Glendale PS Department is installing new generating unit

minal substation to the San Manuel Copper Co. mine now being developed. This mining project has been under development for several years and a new townsite is rising on the desert. The company is extending its distribution facilities to the townsite now under construction, and when completed will have approximately 7,500 inhabitants. The terminal substation to feed the mining load and surrounding area will have transformer capacity of 80,000 kva; and when the mine and smelter are in full operation, including the townsite and other load, the initial demand will reach approximately 50,000 kw.

Another major project was the construction of a terminal substation approximately 35 miles west of Phoenix on the 161-kv transmission system to deliver power directly to that area without going through the Phoenix terminal. The capacity of this terminal is 50,000 kva. The substation structure is a new design as shown in an accompanying photograph, the semirigid box-type structure incorporated being superior to the conventional lattice-type construction. This type construction required very little field erection, as it was just a matter of placement of the principle parts and a bolting-up process. This design will be incorporated in future structures, since it is readily adaptable to various methods of installation.

The 1954 construction program calls for approximately $20,000,000 expenditure as compared with $16,000,000 in 1953. Generating plant construction at Saguaro and starting of the Ocotillo plant accounts for $13,000,000; construction of approximately 20 miles of 69-kv lines, including substations, accounts for about $1,000,000; new distribution facilities, meters, transformers and street lighting account for approximately $4,000,000; and another $2,000,000 are for distribution system reinforcing, capacitor installations and general improvements.

The program of converting distribution system lines and facilities from lower voltages to 7,200/12,470-v level is continuing, and within a few years the lower class voltage will be eliminated entirely from the system with the exception of a few isolated areas not warranting the change.—*George H. Groh, vice-president.*

Boulder Canyon Project, USBR

A call for bids was issued in November for the manufacture of the 145,000-hp hydroelectric turbine for the 104,500-kw unit N-8 of the Hoover power plant. Installation of this unit, planned to go on the line about June 1957, will bring the plant's total installed capacity to 1,354,300.

Salt River Power District

In order to serve the 1953 summer load, four new 69/12-kv substations and two existing substations, with their capacity doubled, were required. One of the new substations supplies 10,000 kva to a foundry of the electric furnace type. This plant is the largest unit of 60-cycle load on the system. A 30,000-kw frequency changer installation was finished at Mesa, which more effectively met the requirements of the seasonal fluctuating 25- and 60-cycle system loads. Installation of 20,000 kvar of capacitors was made with about half connected in banks at the substation 12-kv distribution bus and the remainder pole mounted out on the distribution feeders.

Four of the original construction camp houses at Roosevelt Dam, being used as operators' quarters, were replaced with modern pumice block houses, employing ceiling-type radiant heating by electricity. Six more will be completed in 1954, making a model village at this remote location.

Two large warehouses were constructed, one at Cross Cut and the other at Kyrene, as well as a new central line construction headquarters at the main 16th St. yard.

Conversion of Mormon Flat Dam hydro station from manual to remote semiautomatic operation is in its final stages. The station will be normally operated from Mesa, with local manual operation only in case of an emergency.

Construction of the 66,000-kw Kyrene outdoor Unit No. 2 is progressing on schedule. It is expected to be in commercial operation before June 1954, and will increase the plant rating to 99,000 kw.

The year 1954 will see the inauguration of 60-cycle service to the mountain areas at the east end of the system. Using 30 miles of existing line and 29 miles of new 115-kv H-type construction on wood poles with 266,800 CM ACSR conductors, power from a 28,500-kva autotransformer bank at Mesa will be transmitted to Ray, Ariz.

New Buildings Planned

Approximately a quarter million dollars have been budgeted to replace the presently outmoded and crowded main administration building. Plans for the new building are incomplete.

A new garage to service the project's 500 vehicles will be completed early in 1954. It will be constructed of concrete block and steel trusses with radiant floor heating and the most modern repair facilities.

Studies are being made to determine feasibility of converting Horse Mesa to automatic operation as well as the utilization of pumped storage for all of the four dams on the Salt River.—*T. M. Morong, chief engineer.*

Tucson GEL&P

The company's new 20,000-kw unit was placed on the line June 15, 1953, and capability under test runs has been found to be in excess of 27,000 kw.

We expect to have the 40,000-kw unit, now under construction, in operation sometime during 1954. This will represent a quadrupling of the capacity of the De-Moss Petrie plant since November 1949.—*C. E. Hockings, executive assistant.*

California

Burbank PS Dept.

Major addition to the system in the past year was the completion of a 30,000-kw steam turbogenerator, Unit No. 4, which was placed in operation in October 1953, making a total generating capacity of 70,000 kw steam plus 5,109 kw of firm power from Hoover Dam. The system peak for 1953 was 62,500 kw or 5½% higher than the previous year. The system energy consumption for the year was 326,304,000 kwh, only 10.6% higher than in 1952, which represents a reduction in the rate of increase from the two previous years. The increase experienced in 1952 was 14.7% and 1951 was 24%.

Capital expenditures in 1953 totaled $1,854,000, whereas only $1,200,000 are budgeted for 1954 since no generating capacity is planned for this coming year.

The distribution system continued to expand. Several new tracts were developed in the hillside area of the city and approximately 302 new dwellings were constructed in these tracts. The increase in industrial, commercial and residential electric meters during the year was 9.6%. Our program of distribution system modernization continued throughout the year. Approximately 3.4 miles of mercury vapor street lighting on ornamental standards with overhead wiring were installed at a cost of $84,000.

Expansion of Underground

A new distributing station of 10,000 kva capacity, with ultimate capacity of 20,000 kva, is being planned for start of construction in 1954 and additions to the 34.5-kv transmission system are planned in the forthcoming year. The distribution system modernization and rebuilding program will continue throughout the forthcoming year and a proposed expansion of the primary underground system in the commercial district of the city is planned. The estimated cost of the latter is $95,000.—*A. E. Capon, principal utilities engineer.*

California Electric Power

Principal construction work carried out at fuel-electric generating plants in 1953 consisted of the installation of a 40,000-kw preferred standard generating unit at the outdoor Highgrove steam plant, supplementing the two 30,000-kw units installed in 1952. The third unit was placed in service in November 1953.

Major construction work at hydroelectric plants consisted of refacing a storage dam in the High Sierra, using redwood in place of the original native timber facing. Final completion of this work will be carried out in the summer of 1954.

Other hydroelectric construction work included the installation of approximately 1,500 ft of 48-in.-diameter penstock, replacing two smaller diameter lines; replacement of a section of

Farm Electrification by States

State	Total Farms April 1, 1950*	No. Farms Electrified July 1, 1953	Unelectrified Farms July 1, 1953	Per Cent Electrified Farms
Arizona	10,412	9,457	955	90.8
California	137,168	129,173	7,995	94.2
Colorado	45,578	41,059	4,519	90.1
Idaho	40,284	38,994	1,290	96.8
Montana	35,085	29,816	5,269	85.0
Nevada	3,110	2,078	1,032	66.8
New Mexico	23,599	17,107	6,492	72.5
Oregon	59,827	58,841	986	98.4
Utah	24,176	23,014	1,162	95.2
Washington	69,820	69,168	652	99.1
Wyoming	12,614	11,321	1,293	89.7
Totals	**461,673**	**430,028**	**31,645**	**93.1**

*1950 U.S. Census of Agriculture.

flowline at a highway crossing; construction of garage and shop buildings; additions to existing buildings; erection of buildings and installation of equipment needed in connection with construction work to be carried out in 1954; replacement of generator voltage regulator equipment; and other improvements to auxiliary hydro and electric equipment.

Principal transmission expenditures were for the construction of two sections of transmission line together with related terminal facilities. Both originated at the Highgrove steam plant. One line, approximately three miles in length, is of double-circuit construction on steel towers and connects the Highgrove plant to an existing transmission line, sectionalizing the existing line at the point of juncture. One circuit is of 4/0 copper and the other is of 2/0 copper. The second line, 28 miles in length, is of 2/0 copper on wood poles and constitutes the second transmission line connecting the Highgrove plant and an existing main line substation. Survey and right-of-way work is being carried on in connection with the construction of an additional transmission line originating at the Highgrove steam plant and connecting with another main line substation. Two transmission line substations either have been or are being rebuilt for future 115-kv operation in anticipation of the cutover program to be instituted in 1954 on a system-wide scale.

Other items of transmission construction have included replacement or modernization of oil circuit breakers; installation of magnesium anodes at selected steel towers to stop corrosion; rebuilding and rerouting of a section of 69-kv transmission line where it crosses school property; and the continuation of the program of repoling lines in selected locations.

The distribution construction, in addition to customer extensions, has included transformer capacity totaling 5,000 kva in new substations; 25,400 kva net increase in existing substation capacity; addition of fixed and switched capacitors and addition of regulators at selected locations; modernization of oil circuit breaker installations; cutover of existing lines and substations for 4-kv and 12-kv operation; remodeling and additions at existing office and shop buildings; routine reconductoring and repoling lines in selected areas.

Construction work is also under way on the construction of a 13-mile section of line being built for ultimate 115-kv operation. The line will first be used in the 33-kv service.

1954 Construction Program

During 1954 construction work will be carried on in connection with the installation of the 40,000-kw No. 4 generating unit at Highgrove steam plant.

Work at the hydroelectric generating plants will include improvements to storage dams, intake dams, head gates, flumes and related works; rebuilding the indoor bus and switchboard at one plant; replacement of the waterwheel at another plant; miscellaneous building additions and alterations; and miscellaneous improvements to electrical and hydraulic auxiliary equipment.

The 1954 transmission expenditures are related to expansion of the generating and transmission facilities originating at the Highgrove steam plant and conversion of the transmission system to 115-kv operation.

Principal items included in this dual category will include construction of a transmission line and terminal facilities to provide a second source of power to a main line substation; rebuilding, reconductoring and reinsulation of a section of existing transmission line to increase its capacity and provide for 115-kv operation; relocation of a section of main transmission line subject in its present location to severe icing during winter months; replacement and modernization of oil circuit breaker installations to increase their operating speed; installation of an oscillograph at a main substation; addition of magnesium anodes at selected towers in transmission lines; rebuilding and relocating a main line substation, with increased capacity, to clear state highway realignment; starting general reconstruction for cutover of the transmission system to 115-kv operation in 1956; and routine reconductoring and repoling in selected locations.

In addition to expenditures for customer extensions the following major work will be undertaken: Addition of new substations totaling 5,900 kva; increase of 44,900 kva in transformer capacity at existing substations; installation of new and modernized oil circuit breakers; construction of new commercial, stores and garage buildings and improvements and additions at existing buildings; reconstruction and reconductoring and repoling on existing distribution lines; addition of regulators and capacitors at selected stations and locations; and cutover of existing primaries to 4 kv or 12 kv.—*W. T. Johnson, vice-president and executive engineer.*

California-Pacific Utilities

The company's 1953 projects for new electrical facilities included approximately 20 miles of new 69-kv transmission line in eastern Oregon which interconnected the Union County, Ore., properties with the Wallowa County properties of Pacific Power & Light Co. This will make available up to 6,000 kva additional capacity for this northeastern Oregon county. A new 1,500-kva 69/2.4-kv substation for a growing industrial load at Elgin in northern Union County was also a part of this project.

Typical of the gradual growth of the company's system last year was the addition of 1,100 new electric customers in a northern California serv-

REA Operations — Eleven Western States — 1953

State	Cumulative Construction Loans	1953 Loan Approvals Amount*	Estimated Miles†	Estimated Consumers†	Energized Systems To Dec. 1, 1953 Miles	To Dec. 1, 1953 Consumers	To Dec. 31, 1952 Miles	To Dec. 31, 1952 Consumers
Arizona	$ 19,015,723	$ 2,950,000	854	414	4,023	11,403	3,258	10,817
California	16,887,178	5,295,000	529	10,854	2,908	27,546	2,725	19,989
Colorado	61,736,960	5,430,000	1,135	4,791	28,129	62,428	24,666	55,681
Idaho	15,085,795	490,500	71 cr.	355 cr.	5,956	14,939	5,769	14,276
Montana	44,575,051	5,633,000	2,552	2,623	23,437	36,779	21,556	33,686
Nevada	354,000	.....	.....	.....	165	744	165	742
New Mexico	60,389,596	2,994,000	837	924	16,993	40,923	15,828	37,947
Oregon	32,404,958	1,969,000	310	2,302	8,863	30,541	7,827	28,138
Utah	6,190,907	440,000	433 cr.	1,386 cr.	1,477	4,426	1,445	4,070
Washington	33,498,689	1,070,000	151	318	13,050	32,403	12,693	31,587
Wyoming	25,662,707	462,000	285	120	11,868	17,921	11,101	17,146
Totals	**$315,801,564**	**$26,733,500**	**6,149**	**20,605**	**116,869**	**280,053**	**107,033**	**254,079**

*Loans made during year.
†Net increase or decrease during year.

Current and Future Power Transmission Lines on Bureau of Reclamation Projects

Project	State or States	Line Terminals: Terminal A	Line Terminals: Terminal B	Rating in Kilovolts	Line Length in Miles	Construction Type	Estimated Year of Completion
Minidoka	Idaho	American Falls power plant	Minidoka Dam	115	35	wood pole H frame	....
Palisades	Idaho	Palisades power plant	Goshen No. 2	115	66	wood pole H frame	1956
Palisades	Idaho	Goshen	Michaud No. 1	115	40	wood pole H frame	1957
Palisades	Idaho	Goshen	Michaud No. 2	115	40	wood pole H frame	1957
Palisades	Idaho	Michaud	American Falls power plant No. 1	115	25	wood pole H frame	1957
Central Valley	Calif.	Folsom power plant	Nimbus power plant	115	7	wood pole H frame	1954
Central Valley	Calif.	Elverta	South Sacramento	115	17	wood pole H frame	1958
Central Valley	Calif.	Trinity	Keswick	230	28	steel tower	1960
Central Valley	Calif.	Keswick	Lewiston	13.8	38	wood pole	1960
Davis Dam	Ariz.	Phoenix	Tucson	115	10*	wood pole H frame	1954
Davis Dam	Ariz.	Saguaro	Oracle	115	19	wood pole H frame	1954
Davis Dam	Ariz.	Saguaro	E.D. 5	115	18	wood pole H frame	1954
Collbran	Colo.	Molina	Cameo	69	17	wood pole H frame	1958
Collbran	Colo.	Cameo	Public Service Co. of Colo.	69	1	wood pole H frame	1958
Fort Peck	Mont.	Fort Peck	Glendive	230	130	steel towers	1958
Mo. River Basin	Wyo.	Boysen	Pilot Butte	115	40	wood pole H frame	1956
Mo. River Basin	Wyo.	Bald Ridge	Lovell	115	52	wood pole H frame	1956
Mo. River Basin	Wyo.	Pilot Butte	Lander	115	30	wood pole H frame	1958
Mo. River Basin	Wyo.	Heart Mountain	Bald Ridge	115	25	wood pole H frame	1959
Mo. River Basin	Wyo.	Bald Ridge	Sunlight	115	9	wood pole H frame	1959
Mo. River Basin	Wyo.	Thermopolis No. 2	Lovell No. 2	115	85	wood pole H frame	1960
Mo. River Basin	Mont.	Livingston	Billings	115	116	wood pole H frame	1958
Mo. River Basin	Mont.	Yellowtail	Billings	115	44	wood pole H frame	1958
Mo. River Basin	Mont.	Miles City	Yellowtail	115	142	wood pole H frame	1959
Mo. River Basin	Mont.-N.D.	Glendive	Bismarck	230	208	steel tower	1959
Mo. River Basin	Mont.	Miles City	Broadus	69	80	wood pole H frame	1960
Mo. River Basin	Mont.	Broadus	Ashland	69	42	wood pole H frame	1960
Mo. River Basin	S.D.	Fort Randall	Oahe	230	135	steel tower	1954
Mo. River Basin	S.D.	Oahe	Mobridge	230	73	steel tower	1954
Mo. River Basin	S.D.-Iowa	Fort Randall	Sioux City	230	122	steel tower	1956
Mo. River Basin	S.D.	Big Bend Tap	Huron	230	65	steel tower	1956
Mo. River Basin	S.D.	Huron	Watertown	230	71	steel tower	1956
Mo. River Basin	S.D.	Gavins Point Tap	Gavins Point	115	8	wood pole H frame	1956
Mo. River Basin	S.D.-Minn.	Watertown	Granite Falls	230	76	steel tower	1956
Mo. River Basin	S.D.	Gavins Point	Sioux Falls	115	94	wood pole H frame	1957
Mo. River Basin	S.D.	Big Bend	Big Bend Tap	230	4	steel tower	1960
Mo. River Basin	N.D.-S.D.	Bismarck	Mobridge	230	95	steel tower	1955
Mo. River Basin	N.D.	Jamestown	Fargo	230	86	steel tower	1956
Mo. River Basin	N.D.	Edgeley	Ellendale	115	26	*wood pole H frame	1956
Mo. River Basin	N.D.-S.D.	Ellendale	Groton	115	59	wood pole H frame	1956
Mo. River Basin	N.D.	Lakota	Grand Forks	115	63	wood pole H frame	1956
Mo. River Basin	Wyo.	Sinclair	Rock Springs	115	114	wood pole H frame	1957
Mo. River Basin	Wyo.	Rock Springs	Westvaco	115	35	wood pole H frame	1957
Mo. River Basin	Wyo.-Nebr.	Alcova	Gering	115	206	wood pole H frame	1957
Mo. River Basin	Wyo.	Alcova (2 circuits)	Fremont	115	15	wood pole H frame	1957
Mo. River Basin	S.D.-Neb.	Fort Randall	Grand Island	230	155	steel tower	1958
Mo. River Basin	Neb.	Gavins Point	Belden	115	40	wood pole H frame	1956
Mo. River Basin	Iowa-Neb.	Sioux City	Omaha	230	107	steel tower	1958

*Construct 5 miles new line, salvage 5 miles of old Phoenix-Tucson No. 2 Line.

ice area where the Lassen division took over operation of the electric distribution system at Herlong, Calif. The rapidly growing industrial community of Henderson, Nev., also required extensive construction of new distribution to supply the electric service requirements of customers in a new subdivision of 364 homes. Substation facilities for 1,000-kva gasoline pipe line load were added at Baker, Ore.

Rural Lines

A large part of last year's construction budget was expended to supply the distribution capacity required for the increasing use of electricity by rural and domestic customers who each year have increased their annual use of energy by an average of approximately 15% during the past seven years. Nearly 100% of the prospective rural customers in the company's service area have now been served. This part of the company's construction program has therefore decreased materially with the addition of only a little more than 100 new rural customers during 1953.

The 1954 construction budget will be expended mainly for increased substation and distribution system capacity. This will include a total of approximately 6,000 kva of new substation capacity needed to supply increased demands in the communities of Winnemucca, Nev., Needles and Susanville, Calif. A large part of the increase in demands responsible for increased substation and distribution system capacity is due to the remarkable use of electric energy by domestic customers. As an illustration, the domestic customers in the company's Lassen division at Susanville, Calif., now use slightly less than 6,000 kwh annually, or nearly three times the national average.

The construction budget for next year also includes electric distribution for a 666-unit subdivision of new homes in Henderson, Nev., and approximately 80 miles of new rural line extensions. A number of small industrial loads now in the final planning stage are also being provided for in the 1954 construction budget. These projects also reflect the healthy growth in the use of electric service in all parts of the company's service area, and the company's 1954 construction budget is therefore approximately 10% greater than the amount expended for new electrical facilities last year—*E. K. Albert, executive vice-president.*

Central Valley Project, USBR

Completed in 1953 on the project was the 20-mile, 230-kv Folsom-Elverta transmission line. Construction of the 162,000-kw Folsom power plant on the project's American River division near Folsom, Calif., is about 50% completed. This plant houses three 54,000-kw generators. The Nimbus power plant, 13,500-kw capacity, 15 miles northeast of Sacramento, and Nimbus Diversion Dam are about 80% completed. First power from the Nimbus plant is scheduled to be available by January 1955. The Folsom plant is expected to be in full operation by May 1955.

Coast Counties G&E

Coast Counties Gas & Electric Co. expended approximately $1,500,000 for new and improved facilities during 1953. It is estimated that $1,170,000 will be spent in 1954.

Some of the larger projects for 1953 were: Provision of a second 110-

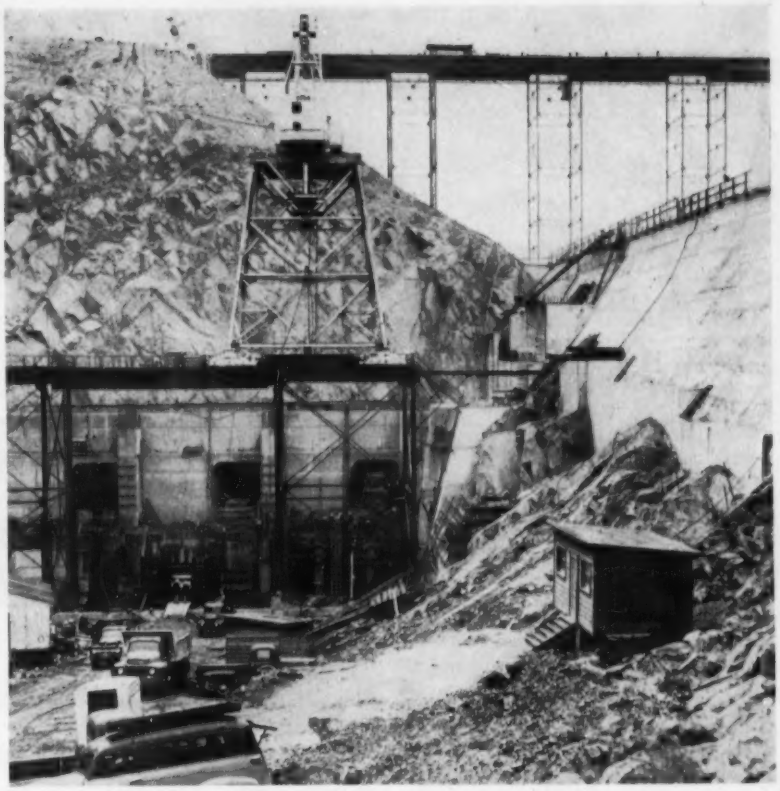
kv line feeding Paul Sweet substation, which supplies energy to the Santa Cruz area; construction of two 24-kv tie lines, one in the Santa Cruz area from Paul Sweet substation to Blaine Street substation, and one in the Watsonville area from Green Valley substation to Watsonville substation; addition of two 3,750-kva unit substations.

Major items planned for 1954 are: Construction of an additional 24-kv line to feed the San Lorenzo Valley located north of Santa Cruz; installation of three 2,000-kva unit substations.—*R. L. Hayden, vice-president and regional manager.*

Glendale PS Dept.

The budget for capital expenditures for the current fiscal year is considerably higher than last year, primarily because of an expansion program made necessary by the annexation of a rather large area adjacent to the northerly portion of the city. Installation of the third unit of generating plant was also not completed until this fiscal year, it being placed in commercial operation during November.

Total budget for 1953-54 is $3,032,000, comprising expenditures for the following major additions: Completion of third generating unit, purchase of



Folsom power house (USBR, Calif.) will contain three 54,000-kw units ready in 1955

Current and Future Development of USBR Power Projects

Project	State	River	Purpose*	Name of Plant	Year of Initial Operation	Present kw	Present No. of Units	Ultimate kw	Ultimate No. of Units
Boulder Canyon	Ariz.-Nev.	Colorado	I,P,FC	Hoover	1936	1,249,800	18	1,354,300	9
Mo. River Basin	Mont.	Missouri	I,P,FC	Canyon Ferry	1953	16,667	1	50,000	3
Colo.-Big Thompson	Colo.	Trans. Mtn. Division	I,P	Flatiron	1954	0	0	71,500	3
Colo.-Big Thompson	Colo.	Trans. Mtn. Division	I,P	Pole Hill	1954	0	0	33,250	1
Kendrick	Wyo.	North Platte	I,P	Alcova	1954	0	0	36,000	2
Eklutna	Alaska	Eklutna Lake Division	P	Eklutna	1954	0	0	30,000	2
Central Valley	Calif.	American	P,FC	Folsom	1955	0	0	162,000	3
Central Valley	Calif.	American	P,FC	Nimbus	1955	0	0	13,500	2
Yakima	Wash.	Yakima	I,P	Chandler	1955	0	0	12,000	2
Mo. River Basin	Mont.	Missouri	I,P	Little Porcupine	....	0	0	18,000	3
Weber Basin	Utah	Weber	I,P,FC	Gateway	1957	0	0	4,000	2
Weber Basin	Utah	Weber	I,P,FC	Wanship	1957	0	0	1,400	1
Palisades	Idaho	Snake	I,P	Palisades	1957	0	0	114,000	4
Mo. River Basin	Mont.	Marias	I,P,FC	Tiber	1957	0	0	2,000	3
Yakima	Wash.	Roza Canal	I,P	Roza	1958	0	0	11,250	2
Collbran	Colo.	Bonham-Cottonwood section—Mesa Pipe Line	I,P	Molina	1958	0	0	5,500	1
Colo.-Big Thompson	Colo.	Trans. Mtn. Division	I,P	Big Thompson	1958	0	0	6,700	1
Mo. River Basin	Wyo.	North Platte	I,P	Glendo	1959	0	0	24,000	2
Collbran	Colo.	Mesa Pipe Line	I,P	Cameo	1959	0	0	2,500	1
Mo. River Basin	Wyo.	North Platte	I,P	Fremont Canyon	1959	0	0	48,000	2
Mo. River Basin	N.D.	Souris	I,P,FC	Crosby	1959	0	0	48,000	6
Mo. River Basin	N.D.	Souris	I,P,FC	Des Lacs	1959	0	0	60,000	10
Mo. River Basin	S.D.	Mo. Oahe Canal	I,P	Miller Drop	1959	0	0	180,000	4
Mo. River Basin	Wyo.	Clarks Fork	P,FC	Baldridge	1959	0	0	30,000	3
Central Valley	Calif.	Trinity	I,P	Lewiston	1959	0	0	2,000	1
Central Valley	Calif.	Trinity	I,P	Tower House	1959	0	0	66,000	3
Central Valley	Calif.		I,P	Matheson	1959	0	0	75,000	3
Minidoka	Idaho	Snake	I,P	American Falls	1960	0	0	30,000	4
Mo. River Basin	Mont.	Powder	I,P	Moorhead	1960	0	0	8,000	2
Mo. River Basin	Mont.	Big Horn	I,P,FC	Yellowtail	1960	0	0	200,000	4
Mo. River Basin	Wyo.	Clarks Fork	P,FC	Thief Creek	1960	0	0	60,000	3
Mo. River Basin	Wyo.	Sunlight	P,FC	Sunlight	1960	0	0	20,000	2
Mo. River Basin	Mont.	Missouri	P,FC	Portage	1960	0	0	20,000	2
Mo. River Basin	Wyo.	Tongue River	P,FC	Tongue River	1960	0	0	25,000	2
Central Valley	Calif.	Boise-Trinity	I,P	Trinity	1960	0	0	75,000	3
Mo. River Basin	Mont.	Madison	P,FC	Lyon	1961	0	0	24,000	3
Mo. River Basin	Mont.	Yellowstone	P,FC	Absaroka (Mission)	1961	0	0	50,000	3
Mo. River Basin	Wyo.	Clarks Fork	P,FC	Hunter Mountain	1962	0	0	12,000	2
Mo. River Basin	Mont.		I,P	Kenil	1962	0	0	1,600	2

*Abbreviations under Purpose: I—Irrigation P—Power FC—Flood Control

Southern California Edison facilities in the annexation district, purchase and installation of two 8,000-kva substations, each with four outgoing 4-kv feeders, and construction of approximately 13 miles of 34.5-kv transmission lines, a portion of which will be on steel towers.

The normal budget program will consist principally of replacing older overhead lines that have passed their economic life, adding 4-kv feeders out of existing substations, and some underground conduit and manhole construction with additional cable circuits.

During 1953 a comprehensive report on street lighting within the city was prepared together with recommendations for future improvements resulting in the adoption of a seven-year joint program with both Public Service and General City Government participating. The estimated total cost of the entire program is approximately $800,000. Recommendation calls for replacement of all open-tvpe radial-wave reflectors with refractor-type globes with a minimum lamp size of 2,500 lumens and the spacing not to exceed 300 ft where mounted on wood poles. As a temporary expedient all existing two-light standards with 4,000-lumen lamps will be increased to 6,000 lumens. Ultimately most of the major thoroughfares and business streets will have mercury-vapor installations on steel poles.

Increase in peak demand was somewhat higher while the increase in energy consumption was somewhat lower than in 1952. The peak demand of 45,500 kw was 6.8% above 1952 and the kwh consumption of 182,500,000 was 6.1% over last year. During the year 4,500 kva of distribution transformer capacity were added to the system as well as 1,400 new service connections.—*L. W. Grayson, chief engineer and general manager.*

Imperial Irrigation District

Imperial Irrigation District expended $3,225,200 for new and improved facilities in 1953, which was slightly above the figure for 1952. For the year 1954 the estimate is $2,500,000.

On Dec. 30, 1953, all construction work was completed on the Drop No. 2 hydro plant, of 10,000 kw capacity in two units, located on the All-American Canal about 30 miles east of El Centro, and the plant was turned over for commercial operation.

A contract was awarded on Nov. 17, 1953, for the reconstruction of a major portion of the former California Electric Power Co. 88-kv transmission line between Calipatria and Blythe. This reconstruction, together with short sections of newly located line on each end, all being built for operation at 161 kv, will provide a second interconnection between the district's system at Niland, Calif., and the Parker-Davis system of the Bureau of Reclamation at Blythe substation. This work is scheduled for completion in August 1954. However, substation work required for energizing this line will probably not be completed before September.

Imperial Irrigation District completed 10,000-kw Drop No. 2 plant in December 1953

Distribution plant was increased during the past year by the addition of approximately 50 miles of new 12-kv and 4-kv lines. Approximately 30,000 kva of combination transmission and distribution substation transformer capacity were added during the year.

The 1953 system peak of 78,300 kw represents an increase of 8.3% over 1952.

Financing was completed in 1953 for system expansions that will include the construction of a 33,000-kw hydro plant at the Pilot Knob site on the All-American Canal. Engineering is now under way with completion tentatively scheduled for early in 1957.—*B. A. Weiss, executive engineer.*

Los Angeles Dept. of W&P

Construction expenditures by the power system of the department for new and improved plant facilities in 1953 were approximately $41,914,000. The 1954 program contemplates a continued high level of new construction which, together with additions and betterments to existing plant, amounts to approximately $61,514,000.

System generation capacity was increased during the year by placing in service the third Owens River Gorge hydroelectric plant, adding 37,500 kw of capacity. No new steam generating capacity was added during the year. A 7.0-mile double-circuit 138-kv transmission line from Valley steam plant to receiving station E was completed. Both circuits are ACSR of 1,113,000 CM with two ½-in. steel overhead ground wires. Five miles of this line replaced previously existing double-circuit 115-kv line, so the net increase was two miles. In addition, 7.9 miles of 115-kv double-circuit line, from receiving station E to receiving station G, were replaced with 138-kv line. The 138-kv line consists of 2.5 miles of double-circuit line on three-circuit towers and 5.4 miles of double-circuit line on double-circuit towers. All conductors are ACSR of 795,000 CM. Overhead ground wires consist of two ½-in. steel wires for the three-circuit towers and one ⅜-in. steel wire for the two-circuit towers.

New receiving station H was placed in initial service with a 60,000-kva 138/34.5-kv transformer bank. This will supply loads in the Hollywood area. A 50,000-kva transformer bank was added at receiving station J in the San Fernando Valley and a 60,000-kva bank at receiving station E, also in the Valley.

Several new distributing stations were completed during the year. These stations, together with bank changes in existing stations, add 77,400 kva of transformer capacity. Distribution lines added included: 17.1 miles of 34.5-kv

First 100,000-kw generator at Valley steam plant of Los Angeles Dept. of W&P. Right: Upper Gorge hydro plant is completed

overhead; 10.8 miles of 34.5-kv underground; 114 miles of 4.8-kv overhead, and 15.7 miles of 4.8-kv underground. The 1953 system peak was 1,019,000 kw on Dec. 22.

The first 100,000-kw unit of the new Valley steam plant is now scheduled to go in service during the spring of 1954. Delays in delivery of materials and equipment have resulted in deferring the completion of this unit beyond its previously scheduled operation for the winter peak of 1953. The second unit, also of 100,000 kw capacity, is scheduled for October and the third unit of 156,250 kw capacity, utilizing reheat, for December.

Transmission line construction will include several sections necessary to interconnect the Valley steam plant properly with existing and new receiving stations. Three sections of two-circuit 138-kv line aggregating 21.7 miles will be constructed. Conductors will be ACSR 795,000 CM. Other lines will include: 3.0 miles of three-circuit towers with two 138-kv circuits of 795,000 CM ACSR and one 115-kv circuit of 300,000 CM copper; 6.9 miles of 138-kv single-circuit on double-circuit towers using conductors of ACSR 1,113,000 CM. All lines will be provided with two ½-in. steel overhead ground wires.

Receiving station capacities will be increased by the addition of a 60,000-kva bank at receiving station H and a new station to be known as receiving station G will be placed in service with two 60,000-kva transformer banks.

Several new distributing stations will go into service. The capacity at these stations together with changes contemplated at existing stations will add 201,750 kva of transformer capacity. New distribution lines to be constructed include: overhead, 14 miles of 34.5 kv and 114 miles of 4.8 kv; underground, 21 miles of 34.5 kv and 18 miles of 4.8 kv, all of which are in circuit miles.

The system generation peak for 1954, based on present estimates, should approximate 1,205,000 kw.—*Ivan L. Bateman, chief electrical engineer and assistant manager.*

Modesto Irrigation District

Capital expenditures for 1953 were approximately $544,000 and are anticipated to be $642,000 in 1954. The communication system was converted from a-m to f-m with 24 mobile units. A 30-mile microwave link is now connected to the district's fixed station transmitter giving an antenna elevation of approximately 1,400 ft. This gives complete coverage of the water and power serving area.

A 5,000-kva 69/12-kv unit substation will be added to the system in 1954. It is anticipated also that five miles of 69,000-v transmission line will be built in 1954. This will provide an additional circuit from the 115-kv step-down station to main receiving station A.

More work is expected to be done on the underground distribution system in order to convert services from the overhead system to the underground system.

During the year approximately nine miles of 12-kv and 4-kv distribution lines were added to the system—*C. E. Plummer, chief engineer.*

Pacific Gas and Electric

The continuous upward climb of this utility's annual peak load reached a new high of 3,340,100 kw during July 1953. This is an 8.6% increase over the 1952 peak of 3,074,900 kw, which also occurred in July.

Electric and gas construction expenditures since the beginning of 1946 through 1953 have totaled approximately $1.2 billion, the $1 billion mark having been passed early last year. Approximately $137,000,000 were expended on electrical facilities alone in 1953 compared with $132,000,000 in 1952. On the order of $125,000,000 are anticipated to be spent on electrical construction during 1954.

Contra Costa units No. 4 and 5 were placed in operation during July and October of 1953. This addition of 235,000 kw of steam-electric capacity raises the station capacity for the five units to 575,000 kw. With this, the company now has in operation two 575,000-kw stations, the other being Moss Landing steam plant, which was completed in 1952. Construction of the four-unit, 600,000-kw Pittsburg steam plant, started in November 1951, is nearing completion with two units scheduled for operation in the summer and two in the winter of 1954. The cost of the Pittsburg plant is estimated at $75,000,000.

Work on the new Morro Bay steam

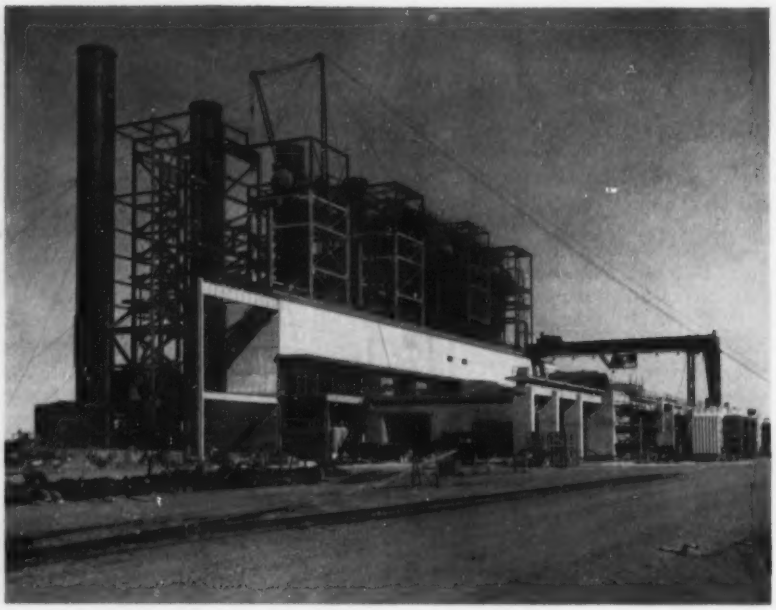
plant in San Luis Obispo County was started in June of 1953, with the first unit scheduled for operation in the spring of 1955 and the second unit anticipated in the spring of 1956. This 300,000-kw plant will be the fourteenth major addition to the company's system since the end of World War II, and will be the sixth postwar steam-electric plant. Construction of Humboldt Bay steam plant is expected to start during 1954, with operation of this 50,000-kw unit presently anticipated in the autumn of 1956. The costs of Morro Bay and Humboldt Bay are estimated at $44,300,000 and $9,600,000 respectively.

Replacement of Murphys power house on Angels Creek was completed early this year. The old plant, which was constructed by the former Utica Power Co. near the start of the century approximately 3,000 feet upstream from the new site, was replaced by a 4,500-kva (3,800 kw) unit driven by a 5,300-hp, vertical-shaft, six jet impulse water wheel. The replacement cost will total about $1,335,000. Construction of the company's new Pit No. 4 hydroelectric project on the Pit River in Shasta County was started in May 1952 and is now well under way. The two 50,000-kva (42,000 kw) units, each driven by a 58,000-hp, Francis-type vertical turbine, are expected to be placed in operation during the summer of 1955. It is estimated that this hydro development, which includes a 21,500-ft tunnel and two 12-ft-diameter penstocks approximately 800 ft long, will cost $25,200,000.

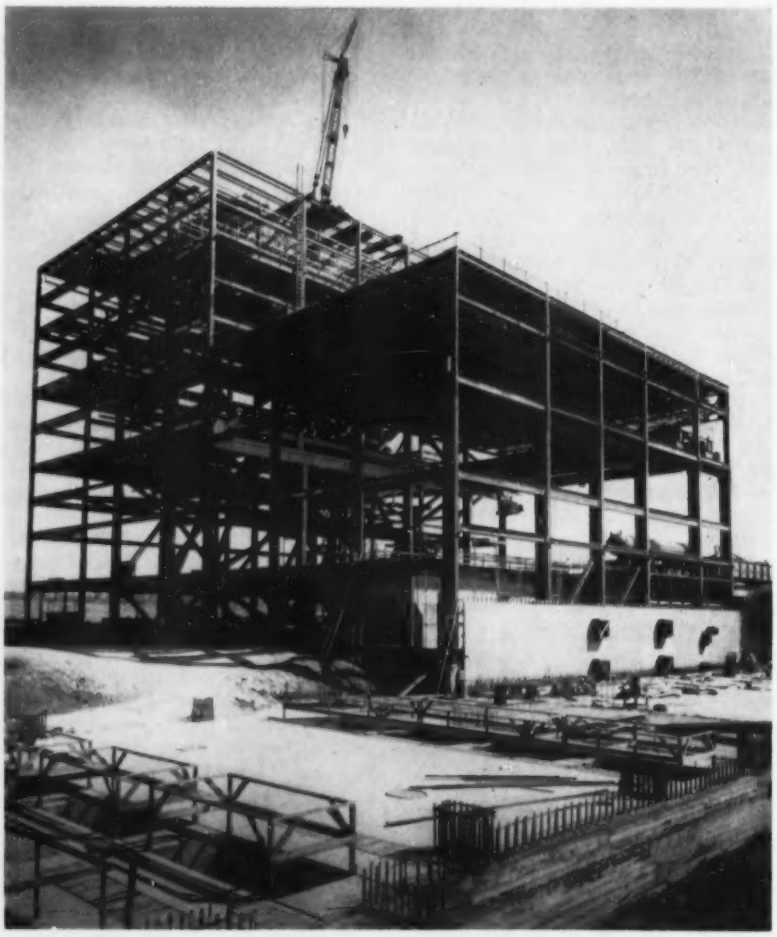
Transmission substation transformer capacity in the approximate amount of 1,217,000 kva, including 262,500 kva of step-up capacity at generating stations, was added to the system during 1953. This figure represents 230/115 kv and 115/60 kv autotransformer capacity, except for the step-up portion. For 1954 it is estimated that about 1,729,000 kva of like capacity will be added, of which 805,000 kva will be step up.

During 1953 the company built some 400 line miles of transmission lines, and an equal number are in prospect for construction this year.

A large number of distribution substations were constructed or enlarged during the past year, adding about 364,000 kva of transformer capacity. Approximately 411,000 kva are expected to be installed this year. These capacities represent secondary voltages under 50 kv and primary voltages up to and including 115 kv. Construction of distribution lines, including line extensions, totaled 1,750 line miles in 1953, with an equivalent amount estimated for 1954. The company's electric customers numbered approxi-

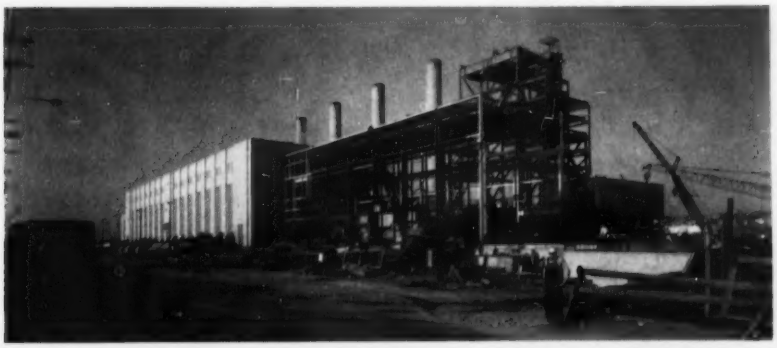


Pittsburgh steam plant of Pacific Gas and Electric Co. will have four 150,000-kw units



Steelwork at Encina plant of San Diego Gas & Electric, 100,000-kw unit due in 1954

Pit 4 power house of Pacific Gas and Electric Co. will add 84,000 kw of hydro capacity



Redondo No. 2 steam plant of Southern California Edison Co. will have 125,000-kw unit

Vermilion Dam and reservoir will store more water for Edison's Big Creek hydro plants

mately 1,512,000 at the end of 1953, an increase of about 53,000 over the previous year.—*Walter Dreyer, vice-president and chief engineer.*

Pasadena L&P Dept.

During the fiscal year 1952-53, energy sold in Pasadena exceeded the previous year by 7.4%. Total revenues increased 8.2% and operating expense 9.5%. Additions to capital amounted to $1,164,039.06.

Distribution transformers in service increased from 88,102 kva to 95,447 kva or 8.3%.

The number of meters increased from 44,061 to 45,058 or 2.3%.

Construction work included primarily the installation of foundations and steel work for the new 40,000-kw B-1 generating station and work on the new dispatching and control building. The 40,000-kw B-1 generating unit should be completed and ready for operation in the summer of 1954. Plans and specifications are being prepared for an additional 40,000-kw generating station B-2, which should be completed during 1956.

The department estimates that the peak demand and load will increase at the rate of approximately 10% during the next year.—*T. M. Goodrich, general manager and chief engineer.*

Riverside PU Dept.

The year of 1953 probably has been one of the busiest yet for the Electric Light Department of the city of Riverside. Thirty-one new residential subdivisions were completed which, along with other new construction, called for the connection of 1,324 new services; 605 new electric range connections were made, which constituted a 10% increase to maintain a range saturation of near 35%. There was also a sizable increase in industrial load.

A board study of our 33-kv transmission system was made at the Illinois Institute of Technology in Chicago last October. This has laid the groundwork for the expansion of the entire system in the future. Another 4,600-kva double-ended unit was added to the industrial substation this year and land and equipment were purchased for the new Mountain View substation to be completed in the fall of 1954. Plans also were made and some equipment purchased to modernize the Arlington substation. The modernization will consist of the rebuilding of two 33-kv breakers, the installation of one new 33-kv breaker, addition of high-speed bank differential protection, automatic control and supervisory control.

During the year 18 miles of primary distribution lines were constructed, including three new trunk feeders. Five existing trunk feeders were rebuilt increasing wire size to 2/0 and 4/0. Distribution transformers with two secondary breakers built in have been used quite extensively in new subdivisions, allowing the secondary mains to be banked. This has resulted in lower installed kva capacity per consumer as well as better voltage conditions and continuity of service. Where the size of the installation did not warrant the breaker-type transformer, secondary fuses were used to facilitate banking. A complete underground distribution system was installed in each of two new subdivisions this year and one was served with 220 v, three phase to supply air-conditioning units being installed in the homes.—*Jack R. Shepard, engineering supervisor.*

Sacramento MUD

Substantial increases in number of consumers served, energy usage and system peak load were recorded during 1953. Number of consumers served at the end of the year totaled approximately 108,800, an increase of about 5% over 1952. Energy sales rose to 660,000,000 kwh, up 10% over 1952, while system peak demand reached 145,000 kw, only 4% greater than 1952.

Plant expenditures for the year amounted to some $2,800,000. Major items included 10 unit substations totaling 27,550 kva, 21 miles of subtransmission line, 69 kv and 23 kv, 98 miles of distribution line, 12 kv and 4 kv, eight underground network transformers totaling 4,000 kva and one additional 12-kv primary supply feeder to the underground network.

The 1954 budget includes $6,500,000 to cover a stepped-up program of plant expansion. Of this total, approximately $2,500,000 are budgeted toward transmission and substation facilities to receive power directly from the Central Valley Project. These facilities include the necessary 230/115/69-kv substation, 25 miles of double-circuit 115-kv transmission line and 60 miles of 69-kv subtransmission line.

Additional overhead plant planned for 1954 includes a new 115/23-kv subtransmission supply station with 40,000 kva capacity to serve the southern part of the city of Sacramento and 12 unit substations totaling 30,500 kva. A program in the rural areas converting the 4-kv distribution to 12 kv and the 23-kv subtransmission to 69 kv is being continued on an even larger scale than in the past. It is anticipated that this program will be complete by 1956.

Status of Western REA-Financed Systems

Borrower	Cumulative Construction Loans 12-31-53	1953 Construction Loans	Miles Energized 12-1-53	Consumers Connected 12-1-53
ARIZONA	**$19,015,723**	**$ 2,950,000**	**4,023**	**11,403**
Navopache Electric Co-op., Lakeside	3,248,000	400,000	651	2,515
Sulphur Springs Valley Electric Co-op., Willcox	5,977,828	1,340,000	1,325	3,575
Littlefield Electric Co-op., Littlefield	20,000		14†	12†
Graham County Electric Co-op., Pima	3,130,672		584	2,319
Trico Electric Co-op.,3800 Oracle Road, Tucson	4,311,368	1,210,000	560	781
Verde Electric Co-op., Cottonwood	558,569		174†	383†
Mohave Electric Co-op., Kingman	777,000		262	445
Duncan Valley Electric Co-op., Duncan	750,000		220	842
Stonewall Electric Co., Tucson	100,000‡		116†	200†
San Carlos Irrig. & Drainage Dist., Coolidge	142,286‡		117†	331†
CALIFORNIA	**$16,887,178**	**$ 5,295,000**	**2,908**	**27,546**
Imperial Irrigation Dist., Imperial	700,000‡		800†	4,100†
Surprise Valley Electrification Corp., Alturas	2,391,500		928†	2,025†
Plumas-Sierra Rural Elec. Co-op., Portola	1,492,000		492	1,042
Mountain Empire Elec. Co-op., Campo	822,000		215	1,213
Sacramento MUD, Sacramento	8,585,000	3,260,000	470†	19,086†
Death Valley Elec. Co-op., Baker	2,035,000	2,035,000	*	*
Anza Elec. Co-op., Anza	750,000		*	*
Mesa Elec. Co-op., Phelan	67,829‡		*	*
Klamath River Elec. Co-op., Hornbrook	43,849‡		31†	80†
COLORADO	**$61,736,960**	**$ 5,430,000**	**28,129**	**62,428**
Grand Valley Rural Power Lines, Grand Junction	1,544,000		692	3,033
San Luis Valley Rural Elec. Co-op., Monte Vista	3,284,000		1,158	2,973
Morgan County Rural Elec. Assn., Fort Morgan	3,896,000		1,893	3,117
Intermountain Rural Elec. Assn., Littleton	3,969,500		2,008	5,470
Southeast Colorado Power Assn., La Junta	8,518,234		4,951†	6,424
Gunnison County Elec. Assn., Crested Butte	789,167	425,000	220	495
Delta Montrose Rural Power Lines Assn., Delta	1,294,000		754	2,032
Union Rural Elec. Assn., Brighton	2,237,000	435,000	831†	3,132†
San Isabel Elec. Assn., Pueblo	1,070,000		644	1,185
San Miguel Power Assn., Nucla	1,106,000	385,000	325	1,271
Highline Elec. Assn., Holyoke	3,719,730		2,436	3,857
Poudre Valley Rural Elec. Assn., Fort Collins	2,353,000		1,182	3,182
La Plata Elec. Assn., Durango	1,809,000		638	1,874
Empire Elec. Assn., Cortez	2,400,448	795,000	768	3,636
Holy Cross Elec. Assn., Glenwood Springs	1,560,000	635,000	553	1,956
Sangre De Cristo Elec. Assn., Salida	1,222,000		455	1,121
Yampa Valley Elec. Assn., Steamboat Springs	3,896,000		970	3,870
Mountain View Elec. Assn., Limon	4,850,500	380,000	2,735	4,030
Y-W Elec. Assn., Akron	3,833,747	440,000	2,164	3,430
K. C. Elec. Assn., Hugo	4,295,000	310,000	1,923	3,461
White River Elec. Assn., Meeker	1,490,893		197	867
Mountain Parks Elec., Walden	2,470,000	1,625,000	551	1,684
Monument Electric Co., Trinidad	128,741		81	328
IDAHO	**$15,085,795**	**$ 490,500**	**5,956**	**14,939**
Northern Lights Inc., Sandpoint	2,939,750		1,118	3,401
Clearwater Valley L & P Assn., Lewiston	3,857,000	194,000	1,889	4,132
Kootenai Rural Elec., Coeur d'Alene	1,211,000		693	2,124
Idaho County L & P Co-op. Assn., Grangeville	1,153,500	180,000	615	1,165
Raft River Rural Elec. Co-op., Malta	1,192,500	116,500	440	777
Fall River Rural Elec. Co-op., Ashton	1,435,000		539†	1,567†
Lost River Elec. Co-op., Mackay	1,327,000		259	889
Prairie Power Co-op., Fairfield	424,000		235	214
Salmon River Elec. Co-op., Challis	1,350,030		31†	250†
Long Valley Power Co-op., Donnelly	196,045‡		165†	420†
MONTANA	**$14,575,051**	**$ 5,633,030**	**23,437**	**36,779**
Ravalli County Elec. Co-op., Corvallis	871,700	195,000	372	937
Sun River Elec. Co-op., Fairfield	2,004,500		1,798	2,290
Lower Yellowstone Valley Elec. Co-op., Sidney	1,861,600	385,000	1,045	1,491
Yellowstone Valley Elec. Co-op., Huntley	1,675,498	270,000	927	2,289
Vigilante Elec. Co-op., Dillon	2,233,000		1,186	1,912
Missoula Elec. Co-op., Missoula	1,135,000		556	1,107
Flathead Elec. Co-op., Kalispell	2,745,000	780,000	706	2,424
Fergus Elec. Co-op., Lewistown	3,091,354	370,000	2,054	2,505
Park Elec. Co-op., Livingston	1,250,000	250,000	656	1,176
Mid-Yellowstone Elec. Co-op., Hysham	560,000		348	698
Beartooth Elec. Co-op., Red Lodge	1,292,000		968	1,652
Big Horn County Elec. Co-op., Lodge Grass	1,857,000		705	1,258
Big Flat Elec. Co-op., Malta	1,319,000		736	702
Sheridan County Elec. Co-op., Medicine Lake	2,640,000		1,790†	1,972†
Northern Elec. Co-op., Opheim	1,810,000		991	1,030
Valley County Elec. Co-op., Glasgow	935,000		566	745
McCone County Elec. Co-op., Circle	3,752,399	1,120,000	1,564	2,232
Goldenwest Elec. Co-op., Wilbaux	1,139,000		727	721
Glacier County Elec. Co-op., Cut Bank	2,886,000	1,180,000	792	2,632
Marias River Elec. Co-op., Shelby	1,911,000		842	2,363
Hill County Elec. Co-op., Havre	3,335,000	650,000	2,233	1,670
Tongue River Elec. Co-op., Ashland	1,578,000		931	911
Southeast Elec. Co-op., Ekalaka	1,633,000	433,000	644	878
Lincoln Elec. Co-op., Eureka	1,110,000		251	994
Elmo Elec. Co-op. Assn., Proctor	220,000		49†	190†
NEVADA	**$ 354,000**		**165**	**740**
Alamo Power Dist. No. 3, Alamo	99,000		36	86
Overton Power Dist. No. 5, Overton	255,000		129	658

Borrower	Cumulative Construction Loans 12-31-53	1953 Construction Loans	Miles Energized 12-1-53	Consumers Connected 12-1-53
NEW MEXICO	**$60,389,596**	**$2,994,000**	**16,993**	**40,923**
Central Valley Elec. Co-op., Artesia	3,801,000	...	939	2,772
Roosevelt County Elec. Co-op., Portales	2,762,000	250,000	1,263	2,594
Farmers' Elec. Co-op., Clovis	3,838,000	302,000	2,309	3,857
Kit Carson Elec. Co-op., Taos	2,572,215	...	696	4,264
Otero County Elec. Co-op., Cloudcroft	2,728,183	315,000	989	2,018
Mora-San Miguel Elec. Co-op., Mora	1,483,000	...	700	1,759
Northern Rio Arriba Elec. Co-op., Chama	847,800	...	248	946
Sierra Elec. Co-op., Truth or Consequences	598,000	...	239	498
Plains Elec. (Generation and Transmission) Co-op., Albuquerque	9,045,000	...	*	*
The Socorro Elec. Co-op., Socorro	3,097,000	...	1,170	2,060
Central New Mexico Elec. Co-op., Mountainair	3,501,400	...	1,147	2,756
Continental Divide Elec. Co-op., Grants	4,283,500	172,000	2,246	3,112
Lea County Elec. Co-op., Lovington	3,440,000	230,000	650†	2,482†
Columbus Elec. Co-op., Columbus	9,253,000	...	1,475	4,480
Southwestern Elec. Co-op., Clayton	3,715,000	1,725,000	793	875
Jemez Mountains Elec. Co-op., Espanola	1,410,000	...	1,147	807
Stonewall Elec. Co., Albuquerque	3,880,000	...	863	5,154
Springer Elec. Co-op., Springer	134,498‡	...	119†	489†
OREGON	**$32,404,958**	**$1,969,000**	**8,863**	**30,541**
Blachly-Lane County Co-op. Elec. Assn., Eugene	1,302,000	200,000	261†	1,211†
Benton-Lincoln Elec. Co-op., Corvallis	5,540,000	...	1,362	4,634
Umatilla Elec. Co-op. Assn., Hermiston	1,173,000	...	446	2,115
Douglas Elec. Co-op., Roseburg	2,950,674	445,000	764	3,532
Lane County Elec. Co-op., Eugene	3,342,426	560,000	702†	4,781†
Coos-Curry Elec. Co-op., Coquille	4,192,604	...	707†	4,063‡
Sandy Elec. Co-op., Sandy	1,064,000	...	218	834
Tillamook PUD, Tillamook	1,776,000	...	75†	469†
Central Elec. Co-op., Redmond	1,776,000	...	732	1,700
Wasco Elec. Co-op., The Dalles	2,340,000	279,000	1,080	1,457
Columbia Basin Elec. Co-op., Heppner	1,665,000	...	759	724
West Oregon Elec. Co-op., Vernonia	2,069,000	185,000	436	2,454
Eastern Oregon Elec. Co-op., Pendleton	795,000	...	212	523
Columbia Power Co-op. Assn., Monument	2,234,000	...	568	848
Midstate Elec. Co-op., Lapine	1,045,000	300,000	172†	484†
Malheur Co-op. Elec. Assn., Vale	463,670‡	...	365†	621†
Jordan Valley Elec. Co., Jordan Valley	27,584	...	4†	91†
UTAH	**$ 6,190,907**	**$ 440,000**	**1,477**	**4,426**
Garkane Power Assn., Richfield	1,629,500	440,000	496	1,664
Moon Lake Elec. Assn., Altamont	3,827,000	...	808	2,378
Escalante Valley Elec. Assn., Beryl	322,800	...	100†	244†
Flowell Elec. Assn., Fillmore	34,000	...	30†	63†
Dixie Rural Elec. Assn., St. George	63,000	...	30†	32†
Utah-Arizona Elec. Assn., Kanab	300,000	...	*	*
Beaver Valley Elec. Assn., Beaver City	14,607‡	...	13†	45†
WASHINGTON	**$33,498,689**	**$1,070,000**	**13,050**	**32,403**
Benton Rural Elec. Assn., Prosser	3,894,500	...	1,079	3,314
Orcas P&L, Eastsound	1,807,600	...	300†	1,426†
Mutual P&L, North Bend	146,919	...	30†	82†
PUD No. 1 of Klickitat County, Goldendale	2,805,000	...	906†	2,275†
Inland Empire Rural Electrif. Inc., Spokane	4,418,280	410,000	2,955	5,932
Columbia County Rural Elec. Assn. Inc., Dayton	1,637,000	265,000	815	1,018
Quinault Light Co., Quinault	763,000	...	34†	281†
PUD No. 1 of Kittitas County, Ellensburg	443,000	...	234	601
Chelan County Elec. Co-op. Inc., Leavenworth	281,000	50,000	94†	398†
Okanogan County Elec. Co-op. Inc., Winthrop	225,000	...	137	435
Pend Oreille Elec. Co-op. Inc., Newport	1,511,000	...	520	1,130
Big Bend Elec. Co-op. Inc., Ritzville	3,407,000	...	1,258	1,361
Lincoln Elec. Co-op. Inc., Davenport	1,642,000	...	1,157	1,112
Nespelem Valley Elec. Co-op. Inc., Nespelem	521,000	...	227	530†
Ferry County PUD No. 1, Republic	1,720,000	345,000	654	1,271
PUD No. 1 of Douglas County, Bridgeport	4,197,000	...	869	4,062
Mason County PUD No. 1, Shelton	170,000	...	48†	227†
PUD No. 1 of Cowlitz County, Longview	201,192‡	...	185†	680†
Stevens County Elec. Co-op. Inc., Colville	2,243,996‡	...	1,060†	2,280†
Molson-Chesaw Elec. Co-op., Molson	315,000	...	*	*
PUD No. 1 of Clallam County, Sequim	418,214	...	75†	930†
PUD No. 2 of Grant County, Ephrata	49,280‡	...	24†	743†
PUD No. 1 of Pend Oreille County, Newport	213,956‡	...	59†	498†
PUD No. 1 of Lewis County, Chehalis	467,752‡	...	330†	1,817†
WYOMING	**$25,662,707**	**$ 462,000**	**11,868**	**17,921**
Riverton Valley Elec. Assn. Inc., Riverton	1,575,000	...	926	1,567
Big Horn Rural Elec. Co., Basin	1,525,000	142,000	747	1,478
Wyrulec Co., Lingle	1,859,600	...	1,072	1,881
Bridger Valley Elec. Assn., Mountain View	1,157,801	...	335	771
Wheatland Rural Electrif. Assn., Wheatland	1,241,000	320,000	817	937
Lower Valley P&L, Freedom	4,206,006	...	364	1,334
Garland L&P, Powell	375,300	...	198	494
Washkie Rural Elec. Co., Worland	172,500	...	102	258
Rural Elec. Co., Pine Bluffs	3,057,000	...	2,031	2,841
Hot Springs County Rural Elec. Assn., Thermopolis	1,240,000	...	631	693
Carbon P&L, Saratoga	1,057,054	...	635	1,261
Niobrara Elec. Assn. Inc., Lusk	2,376,000	...	1,319	1,235
Shoshone River Power, Cody	1,365,000	...	308	345
Sheridan-Johnson Rural Elec. Assn., Sheridan	1,485,000	...	672	786
Tri-County Rural Elec. Assn., Sundance	2,891,746	...	1,546	1,812
Sheridan Suburban Elec. Co., Sheridan	78,700‡	...	165†	228†

*Not energized
†Estimate
‡Loan repaid

In the underground system, continued expansion of the 12-kv fed secondary network is planned with the installation of approximately eleven 500-kva network transformers during 1954.

Presently under construction is the laying of two 5-in. somastic-coated high-pressure pipe lines, each approximately one mile long. These pipe lines will carry two 115-kv cable circuits under oil pressure of 200 psi to downtown station A where, in conjunction with transformer capacity of 35,000 kva, a new supply point will be established to serve the 12-kv radial feeders in the underground system.—*C. R. Day, electrical engineer.*

San Diego G&E

Peak load in 1953 reached a new high of 359,000 kw in December. This is a 5.9% increase over the 1952 peak of 339,000 kw. December temperatures were abnormally high and precipitation was low (0.03 in.). It is believed that with a normal December the peak would have approximated 373,000 kw or a 10% increase over the 1952 peak. In 1953 it is estimated that 15,500 new electric meters will be added, bringing the total served to approximately 226,000.

During 1953 the company spent approximately $15,000,000 on the expansion of its electric facilities. Of that amount, $6,300,000 were spent on our new Encina generating plant at Carlsbad; $3,200,000 were spent for new customer extension, and $4,600,000 for the strengthening of our transmission and distribution facilities.

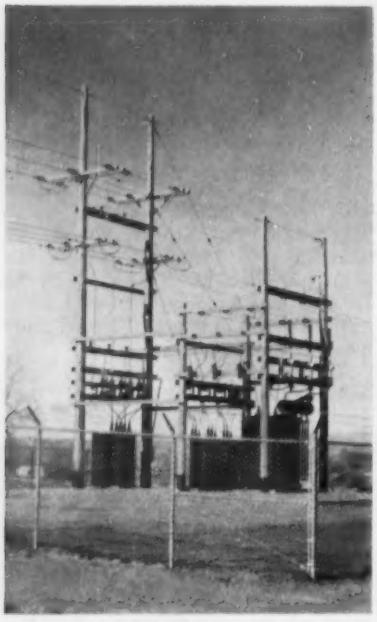
The capital expenditure budget for electric facilities in 1954 will be approximately $20,900,000. About $8,400,000 of this will be spent for the completion of Unit No. 1 at Encina, and about $300,000 for preliminary expense on Unit No. 2 at Encina. New customer extensions will approximate $3,000,000, and improvements in our transmission and distribution departments will be close to $8,000,000. Other budget items include a new office building for the northeast section of San Diego and a microwave communication system.

During the past year approximately 122,000 kva of transmission substation capacity were installed. The comparable estimate for 1954 is 227,000 kva. Thirteen miles of transmission line were constructed in 1953 and 88 miles are planned for 1954. Numerous distribution substations were added to the system, totaling approximately 44,000 kva of transformer capacity, and the company expects to add about 43,000 kva capacity in 1954.

Distribution line construction in

A typical unit sub of Sacramento MUD

Pipe lines for the Sacramento Municipal Utility District's first 115-kv oil-filled cable



Distribution sub, Southern Colorado Power

Pole Hill plant, 33,250 kw, goes into operation on USBR Colorado-Big Thompson project

1953 amounted to 225 line miles and in 1954 the company expects to construct 175 line miles.—*H. A. Noble, vice-president in charge of operation.*

Southern California Edison

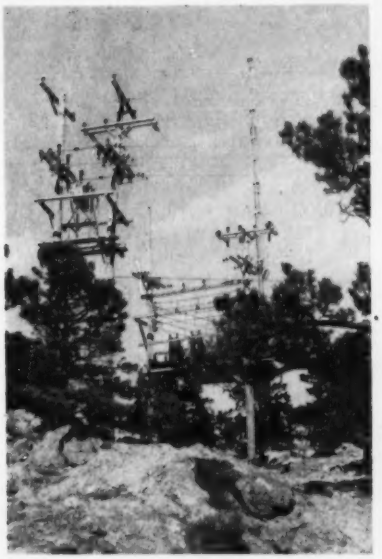
Approximately $72,000,000 were expended during the year 1953 for plant additions to generation, substation, transmission lines, distribution lines and other system betterments. The budgeted amount for the calendar year 1954 is approximately $72,900,000 for like system additions and betterments.

During the past year 780.6 line miles of distribution circuits were placed in service and 125.2 line miles of transmission circuits were constructed. Seven new distribution substations were constructed with a capacity of 68,000 kva and one new transmission substation was placed in service with a capacity of 100,000 kva. Transformer capacity of 111,350 kva was added to existing distribution substations and 170,000 kva added to existing transmission substations. Approximately 72,000 new meters and 750,000 hp of new load were connected to the system.

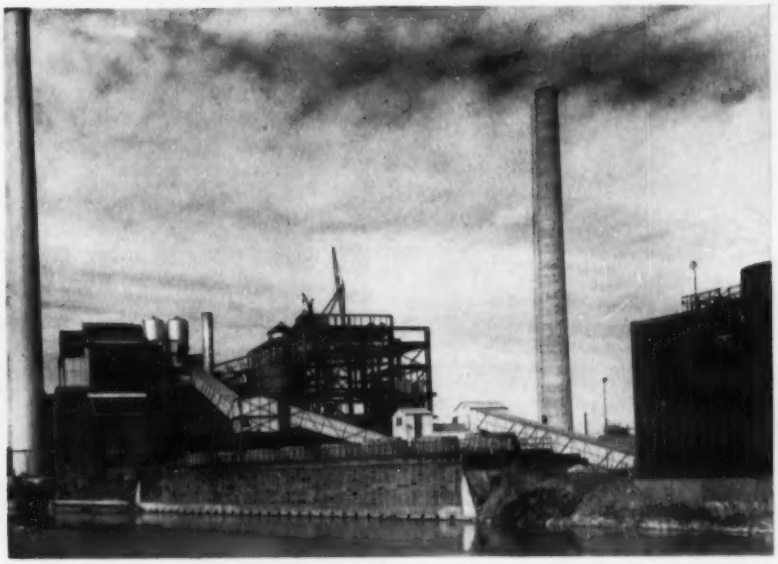
Construction work on Etiwanda steam station, started March 6, 1951, was completed during the latter part of 1953. It is an outdoor-type steam-electric generating station, located on a 207-acre site in the vicinity of Etiwanda, Calif. The initial installation consists of two outdoor-type 100,000/125,000-kw turbogenerators with their independent 920,000 lb per hour steam generator. The turbines are of the tandem-compound, triple-flow exhaust type for 1,800 psig at the throttle with 1,000° initial temperature and 1,000° reheat. Unit No. 1 was placed in commercial operation on July 10, 1953, and unit No. 2 on November 23, 1953. The station, including industrial waste and fuel supply lines, was completed at a cost of approximately $39,100,000.

One new 220-kv transmission substation, known as Antelope substation, was completed and carried load for the first time on June 2, 1953. It is located on a site 10 miles west of Lancaster, Calif. The initial installation consists of one 75,000/100,000-kva, 220/66-kv transformer bank. Approximate cost was $2,245,000.

Under agreement entered into during 1951 between the City of Los Angeles Department of Water & Power and the Southern California Edison Co., two 100,000-kva, three-phase, 220/138-kv autotransformers and appurtenances were installed and placed in service March 27, 1953. Each of



Colo. Central Power supplies TV stations



Zuni station addition in Denver will add 66,000 kw in 1954, Public Service Co. of Colo.

Flatiron power pumping plant, Colorado-Big Thompson project of Bureau of Reclamation

the parties furnished one transformer to provide a 200,000-kva interconnection between the two electric systems. Subsequently, a previously existing 90,000-kva interconnection between the two systems was discontinued as of Sept. 30, 1953.

Construction work, started in 1952, was continued throughout 1953 on a new steam-electric generating station known as Redondo steam station No. 2 adjoining the present Redondo steam station in Redondo Beach. The new plant, which initially will have one 125,000/156,000-kw turbogenerator with a 1,140,000 lb per hour steam generator, is estimated to cost a little more than $25,000,000 and is scheduled for operation Oct. 1, 1954. The turbine, like those for Etiwanda, is of the tandem-compound, triple-flow exhaust type for 1,800 psig, 1,000° initial temperature with 1,000° reheat.

During the latter part of 1953 construction work was started on a new steam-electric generating station at El Segundo, Calif. The initial installation will consist of one turbogenerator unit, which will be a duplicate of the new unit at Redondo No. 2. The unit is currently scheduled for operation in July 1955. Estimated cost is $24,000,000.

Preliminary construction work was commenced in May 1953 on the Vermilion Valley Dam. It will be a compacted earth-fill dam, located across Mono Creek in Fresno County, with a crest length of approximately 4,250 ft and a height of approximately 160 ft from stream bed to top of spillway gates. The Vermilion Valley reservoir will have a gross storage capacity of approximately 125,000 acre-ft. No power will be generated at this site; however, it is estimated that operation of the reservoir in conjunction with the company's existing plants in the Big Creek-San Joaquin River area will result in an average annual gain of 122,000,000 kwh from these existing plants and, in a very dry year, will increase the aggregate dependable capacity of such plants by as much as 76,000 kw and produce 440,000,000 kwh. Estimated total cost of the project is $8,600,000. The presently scheduled operating date for the reservoir is November 1955.

One new 90,000-kva, 220/66-kv transformer bank is scheduled for installation at the Etiwanda steam station and six new distribution substations are planned for construction in 1954. The new Etiwanda bank and the distribution substations, together with additional transformer capacity to be installed at existing transmission and distribution substations, will require approximately 402,750 kva of new transformer capacity.

Plans are in progress to construct and complete 744 line miles of transmission and distribution circuits in 1954 and to connect approximately 62,000 new meters.—*W. N. Johnson, vice-president in charge of operation.*

Turlock Irrigation District

The past year's construction program included a new 69- to 12-kv substation, enlargement of an existing substation, and 13 miles of 12-kv distribution line. Connections were made to 885 new customers.

Total construction expenditures amounted to $257,000.

This year's program calls for six miles of 69-kv tie line and about 13

miles of distribution line. Further additions of capacitors and voltage regulators are planned.

Construction budget (electrical) is $317,000. — *L. H. Parker, electrical engineer.*

Colorado

Colorado-Big Thompson Project, USBR

Two major power plants, having a combined capacity of 104,750 kw, join this transmountain diversion project's power system this year. They are the Pole Hill power plant, from which first power is to be generated early in 1954, and the Flatiron power and pumping plant, construction of which was essentially completed by the end of 1953. The Pole Hill plant, a single-unit installation, has a capacity of 33,250 kw. The Flatiron installation houses two 31,500-kw generating units and one reversible pump turbine of 8,500 kw capacity. First power is to be available early in 1954. When acting as a pump motor the reversible unit will deliver 370 cfs against a head of 240 ft.

Completed in 1953 was the 9.5-mile, 115-kv Estes-Pole Hill transmission line. Pumps and motors for the 400-cfs Willow Creek pumping plant were installed late in 1953.

Colorado Central Power

Growth in number of customers and gross kilowatt-hour sales was approximately as forecast. On a percentage basis, these increases were: number of customers, up 6%; system demand, up 14%; kwh sales, up 14%.

Construction Expenditures

The company spent for construction during 1953 $960,000. The construction budget for 1954 is $1,000,000.

During the year 1953, the company spent $550,000 for connecting new customers and routine replacements. It spent $300,000 for major system improvements and $110,000 for addition and improvement to company buildings, transportation and miscellaneous capital improvements.

During the year several additions were made to the 13-kv feeder system in the Arapahoe district and the cutover of fringe and rural areas in Arapahoe and Jefferson County districts from 2,400/4,160 v wye to 7,260/13,200 v wye was practically completed.

The second half of a 4,000-kva, 13,200/4,160-v duplex substation was put into service in downtown Englewood during 1953. The first half of this station was installed in 1952.

The year 1953 saw the completion of the third and fourth VHF-TV stations on top of Lookout Mountain. These stations are served from a 13,200-v circuit out of Golden with an alternate 13,200-v circuit for backup, automatic throwover switching is furnished by two 13-kv shunt-operated breakers with no voltage relays and provision for automatic return to preferred feed. This was made possible because of the fact that all the stations were within one-fourth mile of each other and could be fed from a common bus.

The cutover from 7,500 v delta to 7,620/13,200 wye was virtually completed during the year in the Hudson-Keenesburg area of the South Weld County district and a 2,500-kva, 46,000 to 7,620/13,200-v substation was put into service in this area during the year.

Plans for 1954 call for doubling 13-kv system capacity in the Arapahoe district by taking service from a second 15,000/20,000-kva, 115 to 13-kv substation. The company also will add a second 13,200 to 4,160-v substation at Littleton to supplement the capacity available to Littleton. Plans call for adding one 4/0 13-kv feeder circuit to provide additional capacity to the Jefferson County district during the year as well as rebuilding and reconductoring the 13-kv feeder serving the mountain area west of the town of Golden.

Plans for 1954 in the South Weld County district call for the installation of voltage regulator in feeders out of Platteville and Milliken substations and reconductoring of the 7,500-v feeder from Milliken substation to Johnstown. Additional mercury-vapor street lights will be added in practically all municipalities served.—*Lee R. Jones, vice-president in charge of operations and construction.*

Colorado Springs PU Dept.

In 1953 a little over $2,000,000 were spent for new facilities, the main items of which, in addition to ordinary additions and betterments, were the completion of the first unit in a new steam plant; installation work on the second unit, a 45-mile 34.5-kv transmission line to pump city water, and tie line facilities between the two steam plants.

The 1954 budget is for about $700,000 to finish the second unit in the new steam plant and to cover ordinary additions and betterments.—*F. H. Wiley, superintendent, electric division.*

Public Service of Colorado

The Public Service Co. of Colorado spent approximately $19,600,000 on construction projects during 1953 of which about $14,500,000 were for electric facilities. The 1954 construction program is presently set at $19,800,000 with electric facilities requiring $14,500,000 of the total.

A 10,000-kw addition to the Alamosa steam-electric station was placed in operation at the end of 1953. This was the only generating capacity placed in service during the year because of work on the 66,000-kw addition to the Zuni station in Denver falling behind schedule. This unit is now scheduled for completion in the spring of 1954. Ground was broken in November 1953 for a 100,000-kw addition to the company's Arapahoe generating station in Denver. This unit is scheduled for commercial operation in 1955.

During 1953 approximately 29 miles of 115-kv transmission line were placed in service and 13 miles of 44-kv line were completed. Approximately 72,000 kva in distribution substation transformer capacity were added during the year. Approximately 11,600 new electric customers were added during 1953 and system peak reached a new high of 380,230 kw in December 1953.

The 1954 construction program in addition to the generating plant additions mentioned includes construction of approximately 15 miles of 69-kv transmission line in the San Luis Valley and the initiation of construction on approximately 150 miles of 115-kv transmission circuits throughout the company's interconnected system. It is estimated that approximately 75,000 kva of distribution substation capacity will be added to the system to serve the growth in customers and power requirements.—*M. M. Koch, vice-president, electric operations.*

Southern Colorado Power

While the authorized budget for 1953 was about $1,300,000, the probable expenditure will be only about $700,000. Several large pieces of equipment, including unit substations and a mobile substation, were ordered under this authorization but will not be delivered until 1954 accounting for this difference. The 1954 normal budget will be about $1,700,000 with an additional $300,000 for initial expenditure on construction of a 16,500-kw generating unit to be started in midsummer. The figure above includes a 33.5-mile, 115-kv transmission line with its terminal transformer and a 5,000-kva, 69/4.16-kv substation with

about seven miles of 69-kv connecting line.—*W. C. Porter Jr., vice-president in charge of operation.*

Idaho

Albeni Falls Dam
Army Engineers

Albeni Falls Dam is a multiple-purpose project under construction on Pend Oreille River in Bonner County, northwest Idaho, and two miles east of the Idaho-Washington state line. Hydroelectric power, flood control, navigation and other related conservation benefits are objectives of the project. Three 14,300-kw generators will be installed at the site and a major power benefit will accrue to downstream Columbia River hydroelectric plants from the 1,153,000 acre-ft of usable storage created by the dam. This storage will add 169,000 kw of average continuous power to federal plants now existing or under construction.

Dam excavations, cofferdams and

Detroit Dam and power plant with two 50,000-kw units were completed by Army Engineers

Calendar of New Generation—U. S. Columbia River Power System

(Most of these units are included in the complete Calendar of New Generation on pp 100-101.)

1953—Completed

Date	Size—Kw	Plant	Agency
July	142,500	Hungry Horse 3 and 4	USBR
July	50,000	Detroit 1	Army Eng.
Oct.	50,000	Detroit 2	Army Eng.
Nov.	70,000	McNary 1	Army Eng.
Dec.	70,000	McNary 2	Army Eng.
Total	382,500		

1954—Planned

Date	Size—Kw	Plant	Agency
April	18,000	Big Cliff 1	Army Eng.
April	70,000	McNary 3	Army Eng.
July	70,000	McNary 4	Army Eng.
Sept.	70,000	McNary 5	Army Eng.
Oct.	76,000	Lookout Point 1 and 2	Army Eng.
Dec.	70,000	McNary 6	Army Eng.
Total	374,000		

1955—Planned

Date	Size—Kw	Plant	Agency
Jan.	14,200	Albeni Falls 1	Army Eng.
Feb.	38,000	Lookout Point 3	Army Eng.
March	70,000	McNary 7	Army Eng.
April	15,000	Dexter 1	Army Eng.
May	14,200	Albeni Falls 2	Army Eng.
June	70,000	McNary 8	Army Eng.
Sept.	70,000	McNary 9	Army Eng.
Sept.	14,200	Albeni Falls 3	Army Eng.
Sept.	192,000	Chief Joseph 1, 2 and 3	Army Eng.
Oct.	12,000	Chandler 1 and 2	USBR
Dec.	70,000	McNary 10	Army Eng.
Dec.	64,000	Chief Joseph 4	Army Eng.
Total	643,600		

1956—Planned

Date	Size—Kw	Plant	Agency
March	70,000	McNary 11	Army Eng.
March	64,000	Chief Joseph 5	Army Eng.
June	64,000	Chief Joseph 6	Army Eng.
June	70,000	McNary 12	Army Eng.
Sept.	70,000	McNary 13	Army Eng.
Sept.	64,000	Chief Joseph 7	Army Eng.

1956—Planned—Continued

Date	Size—Kw	Plant	Agency
Dec.	64,000	Chief Joseph 8	Army Eng.
Dec.	70,000	McNary 14	Army Eng.
Total	536,000		

1957—Planned

Date	Size—Kw	Plant	Agency
March	64,000	Chief Joseph 9	Army Eng.
June	64,000	Chief Joseph 10	Army Eng.
Sept.	64,000	Chief Joseph 11	Army Eng.
Sept.	28,500	Palisades 1	USBR
Oct.	5,620	Roza 1	USBR
Dec.	64,000	Chief Joseph 12	Army Eng.
Dec.	28,500	Palisades 2	USBR
Dec.	5,630	Roza 2	USBR
Total	324,250		

1958—Planned

Date	Size—Kw	Plant	Agency
March	64,000	Chief Joseph 13	Army Eng.
March	28,500	Palisades 3	USBR
June	64,000	Chief Joseph 14	Army Eng.
June	28,500	Palisades 4	USBR
Sept.	64,000	Chief Joseph 15	Army Eng.
Nov.	27,000	The Dalles (2 fishway)	Army Eng.
Nov.	156,000	The Dalles 1 and 2	Army Eng.
Dec.	64,000	Chief Joseph 16	Army Eng.
Total	496,000		

1959—Planned

Date	Size—Kw	Plant	Agency
Feb.	78,000	The Dalles 3	Army Eng.
May	78,000	The Dalles 4	Army Eng.
Aug.	78,000	The Dalles 5	Army Eng.
Oct.	10,000	American Falls 1	USBR
Nov.	78,000	The Dalles 6	Army Eng.
Dec.	10,000	American Falls 2	USBR
Total	332,000		

BPA—Branch of Power Resources

concrete placement for the spillway and abutments were completed in 1951. In 1952 the spillway structure and power house cofferdams were completed. The full amount of storage was therefore available in 1952, and was urgently needed in downstream plants as 1952 was a very low stream flow year.

Construction of the intake and power house by Albeni Constructors was 95% complete at the end of 1953. A total of 103,000 cu yd of concrete has been placed in the structure. Placement of embedded turbine parts and completion of minor items remain before scheduled completion of this contract in August 1954.

A contract for installation of power house equipment and interior finish of the power house was awarded to Morgan Electric Co. and Wismer & Becker in July 1953 for $990,777. This work is now getting under way and is scheduled for completion in the spring of 1955.

Total estimated cost of the project is about $31,000,000, of which $26,706,000 have been appropriated through fiscal year 1954.

Idaho Power

Idaho Power Co., serving southern Idaho, eastern Oregon and northern Nevada, spent $7,500,000 on improvements during 1953. Most of the expenditure was for line and substation development. This is the first year since 1946 that the company has had no power plant construction under way.

While this company has increased its generating capacity three and one-half times since World War II, the area it serves is continuing to grow and electric requirements may increase in the next five or six years to twice the present load. Thus there is no letup on planning. The company has applications with the FPC for licenses to build three large hydroelectric developments totaling 783,000 kw on the Hells Canyon stretch of the Snake River below Weiser, Idaho. However, budgeting for power plant construction in 1954 remains indefinite, pending the outcome of the FPC hearings on the company's applications. Otherwise, $1,585,000 are budgeted for additional transmission lines; $2,495,000 for distribution facilities; $2,158,200 for substations.

During 1953 Idaho Power built 134 miles of transmission lines, 218 miles of distribution lines, and added 79,000 kva in distribution substation capacity. It reconstructed, or otherwise improved, a large number of overloaded distribution lines and substations.

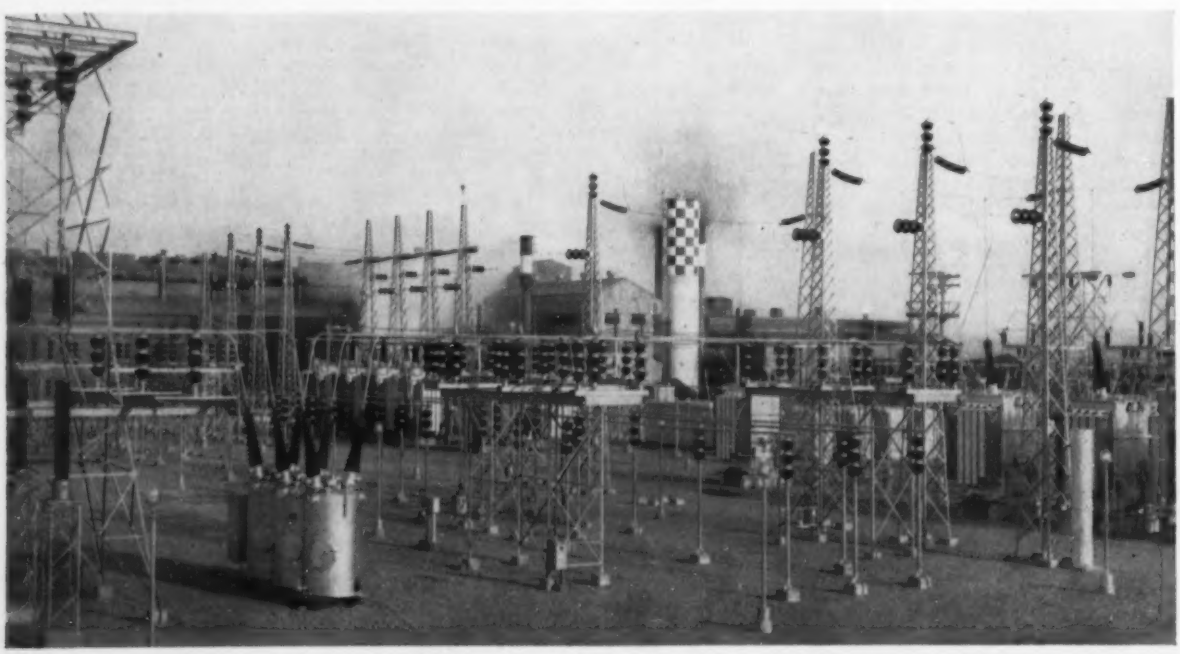
The construction of a 42-mile, 138,000-v line from the King substation to the Eden Junction improved operating conditions in the southern and eastern part of the system.

A 39-mile, 161,000-v transmission line to connect the Don substation at Pocatello with the Goshen substation near Shelley (north of Pocatello), now under construction, will provide an additional high-capacity interconnection with the transmission system of the Utah Power & Light Co. It will also provide a direct transmission interconnection with the system of The Montana Power Co. These three electric companies are joined for the interchange of power. Switching and metering equipment is being installed adjacent to the Goshen substation where the new line interconnects with the existing lines. This line will also increase the electric supply to the Blackfoot area. The 46-kv electric network of the Blackfoot area will be tied to the Don-Goshen line 2¾ miles east of Blackfoot by a 161,000-v tap line. Approximately 20 miles of 46-kv lines will be added in this area to serve the rapidly increasing irrigation well pumping load.

A 20,000-kva bank of transformers is being installed at the company's substation at Blackfoot to reduce voltage from 161,000 to 46,000 for local transmission and distribution of power.

A 12½-mile, 46,000-v transmission line has been constructed from Kenyon tap to Oakley, replacing a line built in 1912 that had become inadequate. Increase in pumping load for irrigation in the Oakley area made the change necessary at this time.

The steadily increasing use of electricity to pump water from wells for irrigation has sent summer load zooming and a sizable part of the Idaho company's construction during 1953 was to serve new pumping installations in the southern and eastern part



Don substation at Pocatello, largest on Idaho Power Co. system, serves four large electric furnaces producing elemental phosphorus

of the Snake River valley. Six years ago, 1,250 irrigation pumps were served by the company. Today, there are more than 3,000 such pumps within the company's system, irrigating 260,000 acres. In size, these pumps range up to 450 hp.

Capacity of the company's big substation at Ontario, Ore., on the western end of the system, was increased with the installation in March of a 20,000-kva transformer. A substation at Mountain Home, in the Central division, was rebuilt to double its capacity and a second substation was constructed near this town to serve a sawmill. All told, improvements were made during the year to approximately 36 substations. New substations were built at Wilson Butte and Notch Butte, near Twin Falls, and at Richfield, near Shoshone. A 69-kv voltage regulator and two 161-kv oil circuit breakers were installed at the substation of Montana Power Co., near Dillon, Mont., to provide improved electric service conditions to the Salmon, Idaho, area and to the Blackbird mine near Salmon.

Present construction plans for 1954, in addition to completing new 161-kv and 46-kv lines in the Blackfoot area, include improving transmission facilities to the McCall and to the Shoshone city areas. This involves construction of approximately 30 miles of 69-kv lines and about 20 miles of 46-kv lines. A number of substations will have to be increased in capacity and three or four small substations added. Distribution system expansion may lag somewhat that of the past several years but this should give an opportunity to catch up on needed reconstruction work.—*B. C. Russell, vice-president and general superintendent.*

Palisades Project, USBR

In March the contract for construction of the power and outlet tunnels for Palisades Dam and power plant was completed. Construction of the dam (largest earth-fill dam ever undertaken by the Bureau of Reclamation) on the Snake River about 45 miles southeast of Idaho Falls and its 114,000-kw power plant is about 45% completed. First of the plant's four 28,500-kw generators is planned to go on the line in October 1957. Full generation of power is scheduled for July 1958.

Montana

Hungry Horse Project, USBR

Construction of Hungry Horse Dam, power plant and switchyard on the South Fork of the Flathead River in Montana, under a completion contract, was finished late in 1953. The last two of the power plant's four 71,250-kw generators were placed in commercial operation in July, bringing the hydroelectric plant at that important unit of the Columbia River Basin system to its full capacity of 285,000 kw. Electrical energy generated at the Hungry Horse plant is transmitted and marketed by the Bonneville Power Administration.

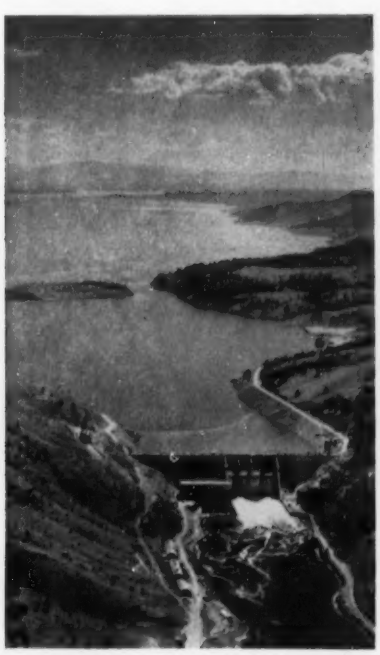
Libby Dam Army Engineers

The Army Corps of Engineers favors construction of the authorized multiple-purpose Libby Dam project on the Kootenai River at a site 15 miles upstream from Libby, Mont.

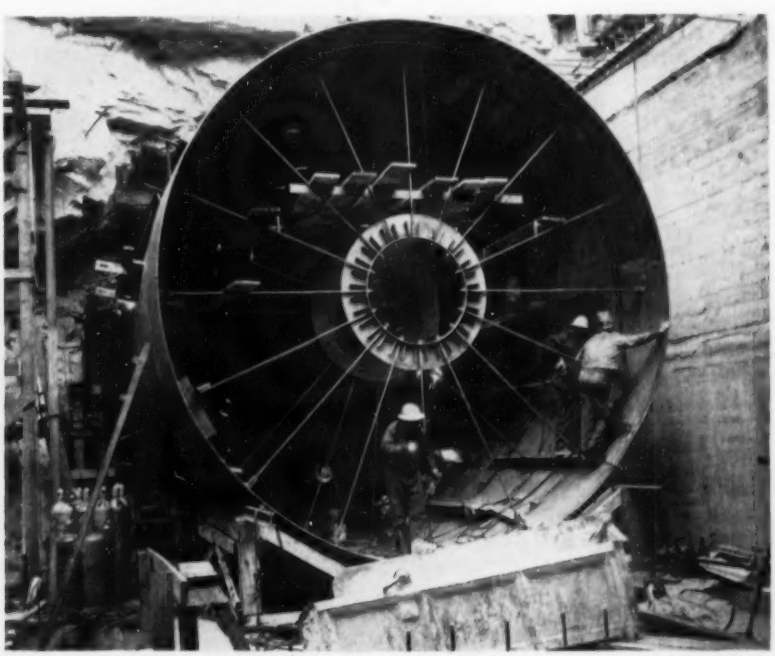
Major General Samuel D. Sturgis Jr., chief of engineers, has approved the recommendation of the dam site by the Seattle District. This location it at river mile 217, above the confluence of the Kootenai and the Fisher Rivers.

Libby Dam, authorized by Congress in the flood control act of May 17, 1950, was recommended as a major element in the master control plan for the Columbia River basin by the Corps of Engineers' 308 Review Report.

The site suggested in the 308 Report was about 11 miles upstream from Libby. Further investigations after authorization, however, pointed to a site at river mile 204.9, about three miles upstream from the town, as the most advantageous for flood control and power benefits. The Corps of Engineers has investigated 12 sites on the Kootenai River between Libby and 20 miles upstream. The mile 217 location



Canyon Ferry plant near Helena, USBR



This 28-ft penstock will serve third 54,000-kw unit at Kerr plant of Montana Power Co.

has been adopted by the corps as the most feasible from construction-economy standpoint by avoiding the heavier railroad and highway relocations expenses and by eliminating any possibility of adverse effect upon important industries.

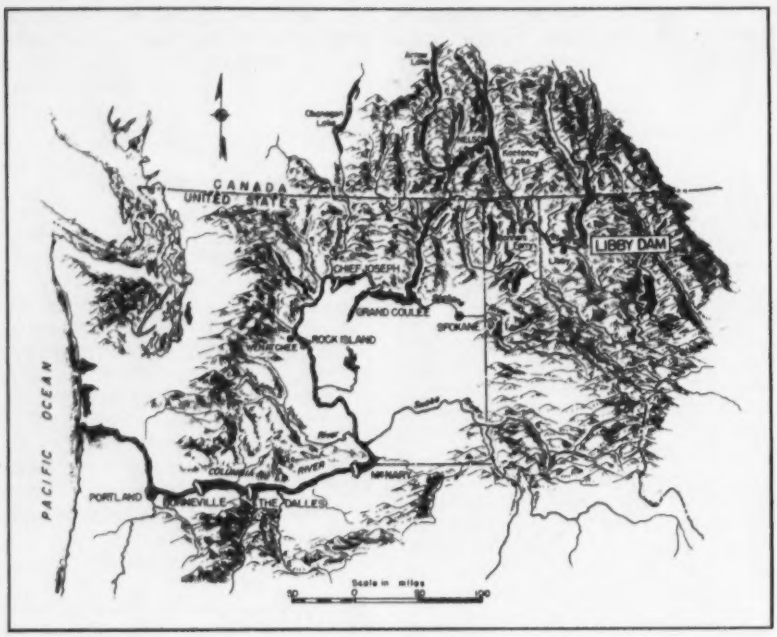
The project as now proposed envisions a straight, gravity overflow, concrete dam 400 ft high, 2,700 ft long with a spillway crest 360 ft long, and containing 3,500,000 cu yd of concrete. The power house, 650 ft long and 95 ft wide, will be constructed on the left downstream toe of the dam. Generation installation planned consists of six 140,000-hp turbines with 100,000-kw generators, totaling 600,000 kw installed rated capacity. Provisions will be made for future installation of two more units, providing an ultimate installed capacity of 800,000 kw, with a head of 350 ft on the turbines. Total U. S. investment in the project is estimated at $263,321,000, with a benefit-to-cost ratio of 1.8 to 1.

In addition to the at-site power production, Libby Dam will add substantially to the contribution of the federal power plants now completed and under construction on the Columbia River—Bonneville, Grand Coulee, McNary, Chief Joseph and The Dalles. Additional power benefits from Libby will be gained by Rock Island near Wenatchee and by the hydro plants on the Kootenay and the Columbia in Canada.

The 95-mile-long reservoir behind Libby Dam will extend 42 miles into British Columbia; will have a surface area of 47,800 acres at normal full pool, and will provide approximately 5,000,000 acre-ft of usable storage for flood control and power production. This reservoir will be approximately 150 ft deep at the international border. At least 4,000,000 acre-ft of storage are needed for control of floods on the stream.

The Columbia River Engineering Board, operating under the direction of the International Joint Commission (which has jurisdiction over water resources involving both the United States and Canada), made studies to determine the most advantageous development of the Kootenai River on both sides of the border. The board recommended a project that would provide a pool elevation of 2,459 ft above mean sea level.

The Libby project will provide control on the Kootenai River in both the United States and Canada, and on the lower Columbia River in the United States. The Kootenay River flows from Canada into Montana—where the name spelling changes to Kootenai—as far southward as Libby, then northwestward across the northeast corner of Idaho and back into British Columbia where it flows into and out of Kootenay Lake and on into the Columbia River north of the Canadian-U. S. border.



Map showing relationship and importance of Libby Dam to federal plants on the Columbia

Huge slab, 180x120x19 ft, is being anchored to canyon wall at Hoover plant. USBR

Navigation, recreation, irrigation and conservation will be additional benefits to the primary objectives of flood control and hydroelectric power from the Libby project.

Alfala is stacked and dried electrically at State Experimental Farm, Huntley, Mont.

New 60-kv Truckee River-Carson City line supplements 1911 lines. Sierra Pacific Power

The United States submitted the Libby Dam project to the International Joint Commission on Jan. 12, 1951, for approval. However, the application was withdrawn in April 1953 to permit clarification of local problems. Recommendation of the mile 217 site by the Corps of Engineers now places the Libby project in favorable position for its resubmission to the International Joint Commission.

The Seattle District of the Army Engineers will continue the planning and preliminary designing of the dam and relocations on basis of the selection of the mile 217 site on the Kootenai above the mouth of the Fisher River.

Missouri River Basin Project, USBR

Construction highlight on this project was completion of the prime contract for Canyon Ferry Dam and power plant in Montana. The contract for completion of the power plant and switchyard is about three-fourths finished. The first of the Canyon Ferry power plant's three 16,667-kw generating units was placed on the line in December. The second and third units are to follow early in 1954.

On the Kendrick project in Wyoming, the Alcova power plant, which is to be integrated into the Missouri River Basin project power system, construction was about three-fourths completed at year's end. The plant is to house two 18,000-kw units.

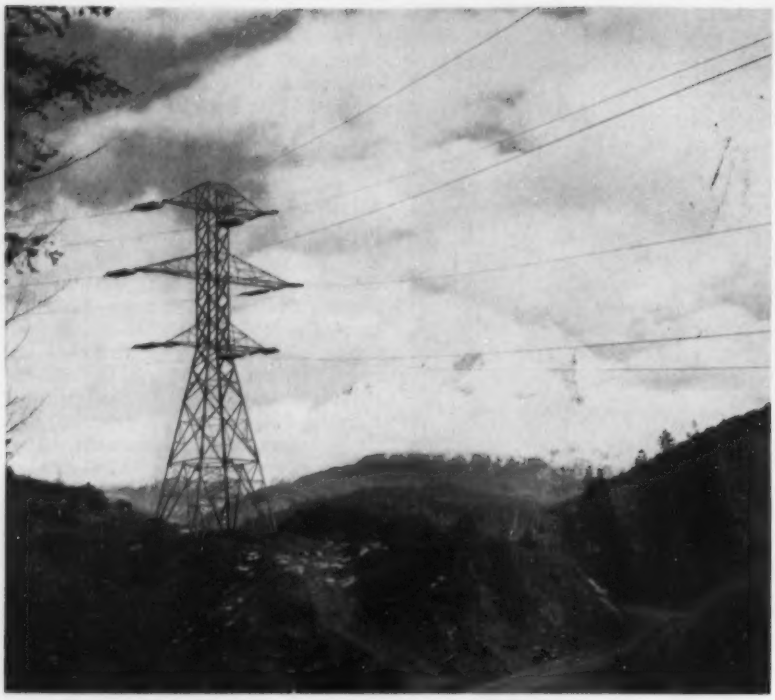
Montana Power

Addition of 56,000 kw of generating capacity to the Montana Power Co.'s hydro system and construction of an express transmission line to meet growth demands in the Billings and Livingston areas will highlight Montana Power's 1954 electric construction program.

Kerr No. 3 hydro unit, started late in 1952, will be completed and placed on the line during the early fall of 1954. Addition of this unit raises to 168,000 kw the installed capacity of the Kerr plant on the Flathead River in western Montana.

The major transmission program will be construction of a 161-kv express line from Anaconda to Billings, a distance of 223 miles. Also included in this project will be construction of a 12.5-mile, 50-kv tap to the city of Livingston. The line will provide an additional source of power for the rapidly growing Billings-Midland Empire region, further bolster the supply in the Livingston area and reduce losses in the transmission of power from the Bird steam-electric plant in Billings to the western part of the company's system.

Principal construction work completed in 1953 included building of a second 100-kv transmission line from the Kerr plant to the Thompson Falls plant in western Montana and reconductoring of two 100-kv lines west from Thompson Falls interconnecting with the Northwest Power Pool at



Big Eddy-McNary 300-kv transmission line built by the Bonneville Power Administration

Burke, Idaho. During the year the company also built a 100-kv line to provide additional power for the Lewistown area; installed 80,000 kva of transformer capacity at the Anaconda substation and a 10,000-kva distribution bank at the Anaconda Copper Mining Co. smelter substation in Anaconda, center of the state's large-scale copper smelting and refining operations; and enlarged distribution facilities in five major Montana cities.

Nevada

Sierra Pacific Power

Nineteen fifty-four will be the third consecutive year in which capital expenditures will approximate $1,750,000. Since all additional power supply requirements are purchased, there are no spectacular items in the budget for new generating capacity; most of the spending being for distribution facilities, in keeping with the steady growth in load.

Distribution substation capacity added during 1953 consisted of one

Calendar of New Generation

(1952 installations have been dropped and 1959 added)

1953—Completed

Date	Size—Kw	Plant	Agency
Jan.	22,500 (H)	Rock Island	Chelan PUD
Feb.	50,000 (H)	Cabinet Gorge	Washington Water Power
March	22,500 (H)	Rock Island	Chelan PUD
April	90,000 (H)	Ross	Seattle Lighting Dept.
April	22,500 (H)	Rock Island	Chelan PUD
May	20,000 (S)	De-Moss Petrie	Tucson GL&P
June	18,000 (H)	Clearwater No.1	Calif. Oregon Power
June	50,000 (H)	Detroit	Army Eng.
July	71,250 (H)	Hungry Horse	USBR
July	71,250 (H)	Hungry Horse	USBR
July	117,500 (S)	Contra Costa	PG and E
July	100,000 (S)	Etiwanda	So. Calif. Edison
Aug.	50,000 (H)	Cabinet Gorge	Washington Water Power
Aug.	37,500 (H)	Upper Gorge	L.A. Dept. of W&P
Oct.	50,000 (H)	Detroit	Army Eng.
Oct.	20,000 (S)	Person	P.S. of N.M.
Oct.	15,000 (S)	George Birdsall	Colo. Springs PU Dept.
Oct.	117,500 (S)	Contra Costa	PG and E
Oct.	30,000 (S)	Burbank	Burbank PS Dept.
Nov.	45,000 (S)	Highgrove	Calif. Elec. Power
Nov.	32,000 (H)	Clearwater No. 2	Calif. Oregon Power
Nov.	20,000 (S)	Glendale	Glendale PS Dept.
Nov.	100,000 (S)	Etiwanda	So. Calif. Edison
Dec.	70,000 (H)	McNary	Army Eng.
Dec.	70,000 (H)	McNary	Army Eng.
Dec.	10,000 (H)	Drop No. 2	Imperial Irrig. Dist.
Dec.	16,667 (H)	Canyon Ferry	USBR
Dec.	10,000 (S)	Alamosa	PS of Colorado
Total	**1,249,167 kw**	**(S) 595,000 kw**	**(H) 754,167 kw**

1954—Planned

Date	Size—Kw	Plant	Agency
Jan.	3,800 (H)	Murphys	PG and E
Jan.	33,250 (H)	Pole Hill	USBR
Jan.	16,667 (H)	Canyon Ferry	USBR
Jan.	90,000 (H)	Ross	Seattle Lighting Dept.
Feb.	31,500 (H)	Flatiron	USBR
March	8,500 (H)	Flatiron	USBR
March	16,667 (H)	Canyon Ferry	USBR
March	15,000 (S)	George Birdsall	Colo. Springs PU Dept.
March	70,000 (H)	McNary	Army Eng.
April	31,500 (H)	Flatiron	USBR
April	100,000 (S)	Valley	L.A. Dept. of W&P
April	18,000 (H)	Big Cliff	Army Eng.
May	100,000 (S)	Saguaro	Arizona PS
May	40,000 (S)	De-Moss Petrie	Tucson GL&P
May	66,000 (S)	Zuni	PS of Colorado

1954—Planned—Continued

Date	Size—Kw	Plant	Agency
June	70,000 (H)	McNary	Army Eng.
June	60,000 (S)	Kyrene	Salt River Power Dist.
July	45,000 (H)	Bridge River	B. C. Elec.
July	25,000 (S)	Steam Plant No. 2	Tacoma PU Dept.
July	40,000 (S)	B-1	Pasadena L&P Dept.
Summer	300,000 (S)	Pittsburg	PG and E
Sept.	36,000 (H)	Alcova	USBR
Sept.	70,000 (H)	McNary	Army Eng.
Oct.	100,000 (S)	Valley	L.A. Dept. of W&P
Oct.	100,000 (S)	Encina	San Diego G&E
Oct.	125,000 (S)	Redondo No. 2	So. Calif. Edison
Oct.	30,000 (S)	Person	PS of N. M.
Oct.	80,000 (H)	Lookout Point	Army Eng.
Oct.	15,000 (H)	Eklutna	USBR
Fall	56,000 (H)	Kerr	Montana Power
Fall	14,000 (H)	Albeni Falls	USBR
Winter	300,000 (S)	Pittsburg	PG and E
Dec.	70,000 (H)	McNary	Army Eng.
Dec.	156,250 (S)	Valley	L.A. Dept. of W&P
Dec.	66,000 (S)	Carbon	Utah P&L
Total	**2,399,134 kw**	**(S) 1,623,250 kw**	**(H) 775,884 kw**

1955—Planned

Date	Size—Kw	Plant	Agency
Jan.	6,750 (H)	Nimbus	USBR
Jan.	15,000 (H)	Eklutna	USBR
Feb.	40,000 (H)	Lookout Point	Army Eng.
Feb.	54,000 (H)	Folsom	USBR
March	6,750 (H)	Nimbus	USBR
March	50,000 (S)	Honolulu	Hawaiian Elec.
March	70,000 (H)	McNary	Army Eng.
Spring	150,000 (S)	Morro Bay	PG and E
Spring	28,000 (H)	Albeni Falls	Army Eng.
Spring	460,000 (H)	Cowlitz	Tacoma PU Dept.
April	54,000 (H)	Folsom	USBR
April	15,000 (H)	Dexter	Army Eng.
May	100,000 (S)	Saguaro	Arizona PS
May	54,000 (H)	Folsom	USBR
June	70,000 (H)	McNary	Army Eng.
June	100,000 (S)	Gadsby	Utah P&L
Summer	84,000 (H)	Pit No. 4	PG and E
July	125,000 (S)	El Segundo	So. Calif. Edison
July	100,000 (S)	Arapahoe	PS of Colorado
Sept.	16,500 (S)	Canon	So. Colo. Power
Sept.	192,000 (H)	Chief Joseph	Army Eng.
Sept.	70,000 (H)	McNary	Army Eng.
Sept.	29,000 (H)	Lemola No. 1	Calif. Oregon Power

3,000-kva bank at Tahoe City, Calif., and two 2,500-kva two-feeder unit substations in Reno.

Completed were the facilities required for service in the new 5,000-kw load of Anaconda Copper Mining Co. at Yerington, Nev., including 70 miles of 60-kv line and switching stations at Carson City and Yerington. A 50-mile 60-kv line was built, linking Carson City and Minden.

Planned for 1954 is addition of two 10,000 (FA 13,333)-kva 60/23-kv transformer banks with regulating feature to bolster the 23-kv subtransmission grid in Reno-Sparks area, with accompanying reinforcement of 23-kv and 4-kv feeder system. Four 2,500-kva-unit substation units, 23/4 kv, for Reno-Sparks and one 3,000-kva bank at Minden substation, are programmed. Capacity installations have become routine and in 1954 will include about 6,000 kvar of switched units in various substations.

The company plans to install one 15,000-kva, 60-kv regulating transformer near Reno to improve voltage conditions on a long 60-kv circuit supplying the Humboldt Valley region of central Nevada.—*V. D. Armstrong, executive engineer.*

Chief Joseph Dam being built by Army Engineers is well along. First units due in 1955

Calendar of New Generation—Continued

(1952 installations have been dropped and 1959 added)

1955—Planned—Continued

Date	Size—Kw	Plant	Agency
Sept.	6,000 (H)	Chandler	USBR
Nov.	45,000 (S)	Highgrove	Calif. Elec. Power
Nov.	6,000 (H)	Chandler	USBR
Dec.	64,000 (H)	Chief Joseph	Army Eng.
Dec.	70,000 (H)	McNary	Army Eng.
Dec.	156,250 (S)	Valley	L.A. Dept. of W&P
Total	**2,237,250 kw**	**(S) 842,750 kw**	**(H) 1,394,500 kw**

1956—Planned

Date	Size—Kw	Plant	Agency
March	70,000 (H)	McNary	Army Eng.
Spring	150,000 (S)	Morro Bay	PG and E
Spring	60,000 (H)	Chief Joseph	Army Eng.
May	100,000 (S)	Octillo	Arizona PS
June	70,000 (H)	McNary	Army Eng.
July	42,000 (H)	Seton Creek	B. C. Elec.
Summer	64,000 (H)	Chief Joseph	Army Eng.
Sept.	70,000 (H)	McNary	Army Eng.
Autumn	50,000 (S)	Humbolt Bay	PG and E
Fall	100,000 (S)	Encina	San Diego G&E
Fall	40,000 (S)	B-2	Pasadena L&P Dept.
Fall	64,000 (H)	Chief Joseph	Army Eng.
Dec.	70,000 (H)	McNary	Army Eng.
Dec.	33,000 (H)	Lemola No. 2	Calif. Oregon Power
Dec.	82,500 (H)	Hoover	USBR
Winter	64,000 (H)	Chief Joseph	Army Eng.
Total	**1,129,500 kw**	**(S) 440,000 kw**	**(H) 689,500 kw**

1957—Planned

Date	Size—Kw	Plant	Agency
Jan.	33,000 (H)	Pilot Knob	Imperial Irrig. Dist.
Spring	64,000 (H)	Chief Joseph	Army Eng.
May	2,000 (H)	Tiber	USBR
June	1,400 (H)	Wanship	USBR
June	104,500 (H)	Hoover N-8	USBR
June	90,000 (S)	———	Salt River Power Dist.
June	4,000 (H)	Gateway	USBR
July	5,000 (S)	Rocky Ford	So. Colo. Power
Summer	64,000 (H)	Chief Joseph	Army Eng.
Summer	90,000 (H)	Ross	Seattle Lighting Dept.
Summer	50,000 (H)	Gorge	Seattle Lighting Dept.
Aug.	100,000 (S)	Denver Area	PS of Colorado
Sept.	30,000 (S)	Burbank	Burbank PS Dept.
Fall	66,000 (S)	Plant X	Calif. Elec. Power
Fall	64,000 (H)	Chief Joseph	Army Eng.

1957—Planned—Continued

Date	Size—Kw	Plant	Agency
Oct.	28,500 (H)	Palisades	USBR
Dec.	130,000 (H)	Ice Harbor	Army Eng.
Winter	64,000 (H)	Chief Joseph	Army Eng.
Total	**990,400 kw**	**(S) 291,000 kw**	**H 699,400 kw**

1958—Planned

Date	Size—Kw	Plant	Agency
Jan.	28,500 (H)	Palisades	USBR
March	6,700 (H)	Big Thompson	USBR
Spring	64,000 (H)	Chief Joseph	Army Eng.
April	65,000 (H)	Ice Harbor	Army Eng.
April	28,500 (H)	Palisades	USBR
May	100,000 (S)	———	Arizona PS
June	5,500 (H)	Molina	USBR
Summer	64,000 (H)	Chief Joseph	Army Eng.
July	28,500 (H)	Palisades	USBR
Aug.	65,000 (H)	Ice Harbor	Army Eng.
Fall	64,000 (H)	Chief Joseph	Army Eng.
Oct.	5,625 (H)	Roza	USBR
Nov.	156,000 (H)	The Dalles	Army Eng.
Dec.	50,000 (S)	Honolulu	Hawaiian Elec.
Dec.	5,625 (H)	Roza	USBR
Winter	64,000 (H)	Chief Joseph	Army Eng.
———	20,000 (S)	Glendale	Glendale PS Dept.
Total	**820,950 kw**	**(S) 170,000 kw**	**(H) 650,950 kw**

1959—Planned

Date	Size—Kw	Plant	Agency
Feb.	78,000 (H)	The Dalles	Army Eng.
May	100,000 (S)	———	Arizona PS
May	78,000 (H)	The Dalles	Army Eng.
Aug.	78,000 (H)	The Dalles	Army Eng.
Nov.	78,000 (H)	The Dalles	Army Eng.
Fall	134,000 (H)	Union Valley, Jaybird, Camino	Sacramento MUD
———	2,500 (H)	Cameo	USBR
———	24,000 (H)	Glendo	USBR
———	48,000 (H)	Fremont Canyon	USBR
———	2,000 (H)	Lewiston	USBR
———	75,000 (H)	Matheson	USBR
———	66,000 (H)	Towerhouse	USBR
Total	**764,500 kw**	**(S) 100,000 kw**	**(H) 664,500 kw**

(H) Hydro (S) Steam

One of outdoor automatic plants on North Umpqua project of California Oregon Power

Distribution line, Pacific Power & Light Co.

New Mexico

Public Service of N. M.

During 1953 approximately $6,500,000 were spent in capital improvements by the four divisions of the Public Service Co. of New Mexico. A total of approximately $7,400,000 has been budgeted for similar purposes in 1954.

In October 1953 the second 20,000-kw steam turbogenerator at Person station in Albuquerque was put in service. The company immediately started the installation of a 30,000-kw generator at the same station and expects to put it into service later in 1954.

About 15 miles of transmission and 175 miles of distribution lines were built in 1953. Construction was also started on a 60-mile, 115-kv line between Santa Fe and Las Vegas, which is expected to be completed in February 1954. Construction was started on a 30-mile, 44-kv line between Albuquerque and Belen, which should be in service by May 1954. This is the second line between these towns for the purpose of insuring service in Belen. About 150 miles of distribution line will be installed during the ensuing year.

A second 25,000/37,500-kva transformer was installed in the transmission substation at Person station to take care of the second unit. A 37,500/50,000-kva transformer will be installed in 1954 for the third unit. The company installed 9,750 kva in distribution substation capacity in 1953 and has budgeted 26,250 kva for 1954. It also installed a second 7,500-kva, 115-kv transformer at Deming to double the capacity of the substation at which it receives all energy for this property from the USBR.

The Albuquerque-Santa Fe system peak increased from 64,200 kw in 1952 to 73,700 kw in 1953, for an increase of 14.8%. Kilowatt-hour output for the entire property has increased 12.5% in the past 12 months. —*E. M. Conwell, general superintendent.*

Oregon

Bonneville Power Administration

Peak energy demand on federal plants was 3,170,000 kw, 5 to 6 p.m. Nov. 18, 1953. This all-time high of demand was made possible by the addition of six generating units during the year. At three plants — Hungry Horse, Detroit and McNary — two units each were added to the line. The five federal plants produced 19,000,000 kwh for Bonneville Power Administration during 1953 for distribution over the BPA transmission system to 115 customers. Revenue from the sale of this power amounted to $42,000,000. Increases over the 1952 calendar year were: peak demand, 10.6%; generation for BPA, 6.2%; number of customers, 2.7%; and revenues, 9.5%.

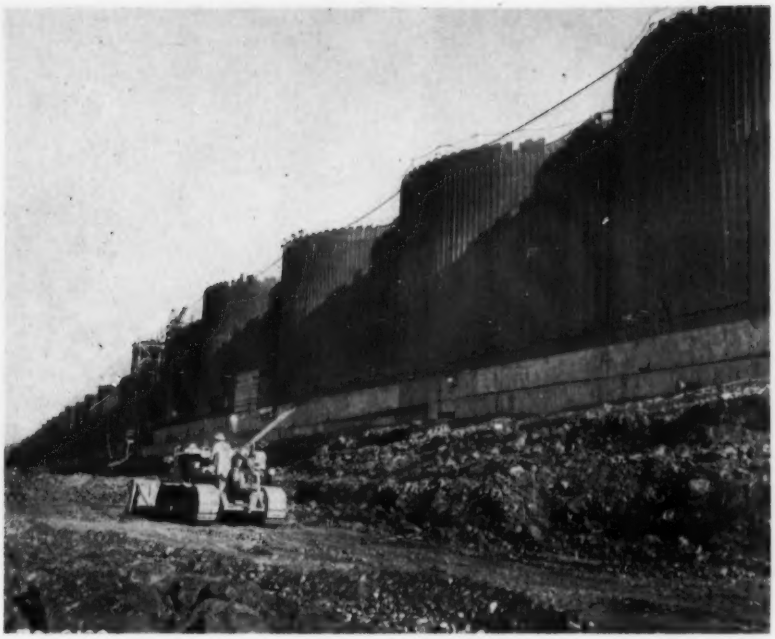
Expenditures for new and improved facilities during 1953 amounted to $50,000,000. Approval of the present budget before Congress will provide an estimated $40,000,000 in 1954. The estimate is based on a transmission line program that will keep pace with the schedule of additional generating plant installations. Transmission system additions during 1953 included 354 miles of 230-kv and 118 miles of 115-kv line, with 527,500 kva of transformer capacity. Plans for 1954 call for 358 miles of 230-kv and 64 miles of 115-kv line, with added transformer capacity of 1,469,667 kva.

Peak generating capacity was increased by about 426,000 kw with installation of two units at Hungry Horse, two at McNary and two at Detroit Dams.

Peak requirements of approximately 8,000,000 kw will need to be met by the federal system in January 1960, according to the most recent estimates of the Bonneville Power Administration. Total federal installations in the Pacific Northwest region of about 6,300,000 kw are planned for installation by January 1960.

California Oregon Power

During the year 1953 the principal items of plant additions were the completion of Clearwater No. 1 and Clearwater No. 2 hydroelectric plants on



Excavation inside power house cofferdam, The Dalles Dam, Army Engineers project

Tower erection, BPA 300-kv line to McNary

the North Umpqua River, aggregating 50,000 kw, partial construction of two more hydroelectric plants (Lemolo No. 1 and Lemolo No. 2) in the same area and aggregating 62,000 kw, and construction of 167 miles of transmission line (including 61.8 miles of 230-kv line completed but not in service). These and other production and transmission plant improvements, together with expansion of the company's distribution facilities (305 miles of distribution line added), required a budget of $18,800,000.

It is expected that the budget for 1954 will be smaller than that for 1953 as neither of the hydro projects under construction on the North Umpqua River is scheduled for completion this year. Most of the company's expansion will be of substation and transmission facilities.—*J. C. Boyle, vice-president and general manager.*

Eugene Water & Electric Board

Capital expenditures for the year 1953 were less than those of the six years previous. Construction activities were confined largely to changing distribution voltage from 2,400 to 12,000 v; initial steps in construction of an underground network to serve the business section of Eugene; addition of approximately two miles of high-intensity mercury-vapor street lighting; and construction of about 20 miles of distribution lines to serve new electric customers.

The peak load of 54,000 kw occurred on Feb. 23. System capacity, excluding the 30,000 kw purchased from the Bonneville Power Administration, is 55,000 kw. An additional 30,000 kw transformer is to be installed by BPA next summer. We are guaranteeing overhead costs on the new capacity.

Studies are being continued on the possibility of developing about 100,000 kw of prime power on the upper McKenzie River, requiring a transmission line to Eugene of 70 miles in length.—*R. B. Boals, general superintendent-secretary.*

McNary Dam Army Engineers

The first two 70,000-kw units at McNary power house went on the line in December 1953 and the remaining 12 units will follow at intervals of three-month periods thereafter.

Major construction work accomplished during 1953 involved raising the upstream lock sill 58 ft; raising 12 low spillway bays 41 ft; completing the power house structure; and completing installation of two main units and two station service units of 3,750 kw each and one fish pump unit with the partial installation of two additional main units and miscellaneous work in the power house and fish ladders.

Expenditures as of Nov. 1, 1953, were $224,000,000. The remainder of the expenditures bring the total of the dam's cost to $286,650,000 and will be spread evenly over the next three-year period with final completion of the 14 units scheduled for December 1956. The reservoir behind McNary Dam has a maximum normal pool elevation of 340 ft above sea level. This was established Dec. 6, 1953.

Mountain States Power

Expenditures by Mountain States Power Co. for additions and betterments during the year 1953 totaled approximately $4,663,000. The construction budget for the year 1954 has been set at $3,962,000.

The 1953 construction program included the completion of 56.5 miles of transmission line. These additions to the transmission system include several projects, the longest of which was near Kalispell, Mont. Some of the other transmission facilities include a 6,000-kva substation at Kalispell, a 15,000-kva substation at Sandpoint, Idaho, increased capacity in substation at Corvallis, Ore., from 10,000 kva to 16,000 kva, a 5,000-kva substation at Casper, Wyo., and the installation of a 25,000-kva, 69-kv regulator in the Coos Bay, Ore., area.

Additions to the transmission system planned for 1954 include a number of small projects, the largest of which is the 20,000 kva increase in capacity of the Springfield, Ore., substation. Some others include construction of a new 6,000-kva substation at Corvallis, Ore., a 10,000-kva substation at Sweet

Home, Ore., a 3,000-kva substation at Lovell, Wyo., and other small installations in Montana and Oregon.

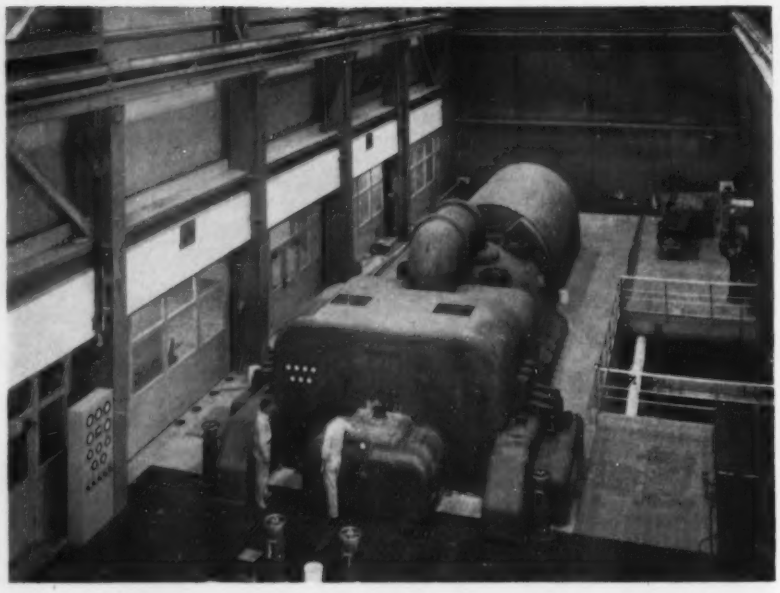
The major portion of the company's capital expenditures completed in 1953 and planned for 1954 were for increased distribution facilities. Rapidly increasing population and activities in irrigation, lumber and oil production have made necessary construction of and planning for approximately 500 miles of distribution line in 1953-54. A number of distribution substations were constructed in 1953 and others are proposed for 1954. These vary in size up to 6,000 kva.—*A. W. Trimble, president.*

Pacific Power & Light

During the year 1953 Pacific Power & Light Co. spent more than $12,800,000 in system additions and improvements. Included in this was an item of $6,657,000 for the completion of the Yale hydroelectric project on the Lewis River. The plant went into operation during the year and indications are that its maximum capability will be in excess of 130,000 kw.

The remainder of the construction expenditures was generally distributed throughout the system and included the completion of the five-year conversion program in the Yakima area. With the exception of a small section serving the business district, the area immediately adjacent to and including Yakima is now served through a 12-kv distribution system. The 20-mile transmission line with substation to serve the Pilot Rock Lumber Co. south of Pendleton was completed and placed in operation. Likewise, the 40-mile 66/110-kv line between our Enterprise system at Enterprise and the California-Pacific Utilities Co. at Elgin was completed and placed in operation. This included a 3,000-kva and a 5,000-kva substation in the Enterprise area and a 66-kv switching station at Elgin. Conversion from 2.4 to 12 kv of the town of Wallowa and rural sections in the Enterprise and Joseph areas was likewise completed.

The continuation of the expansion of the Bend substation included installation of a 7,500-kva 66/2.4-kv transformer. An emergency 66-kv tie line was constructed between this substation and the Midstate Electric Cooperative line west of Bend, which will be used while the Redmond-Bend 22-kv line is being converted from 22-kv to 66-kv operation, work scheduled to be completed early in 1954. A new 5,000-kva substation was constructed in The Dalles to permit converting additional sections of that area to 12-kv distribution and to serve additional loads resulting from construction of The Dalles bridge and The Dalles Dam on the Columbia River. In addition to increased capacity at existing substations in Portland, a new 5,000-kva 66/2.4-kv substation was built.



No. 2 75,000-kw generator at Gadsby plant, Utah Power & Light. Reheat cycle is used

Work was started on conversion from 6.9-kv to 12-kv distribution in the Walla Walla rural area, and the proposed 1954 construction budget of approximately $6,000,000 provides for continuing this conversion program until all of the Walla Walla area distribution system excepting the downtown district is converted from 6.9 kv to 12 kv.

Other items in the 1954 construction budget include a three-mile 115-kv tie line between BPA facilities and our River Road substation in Yakima to reinforce service in that area, a new 4,500-kva 22/2.4-kv substation in Seaside, and a new 3,000-kva substation in Pomeroy. Additional substation capacity is planned for Bend, Prineville, Portland and Walla Walla. Distribution conversion programs will be continued in the Enterprise, Wapato, Portland and The Dalles areas.—*J. Coleman Jones, general superintendent.*

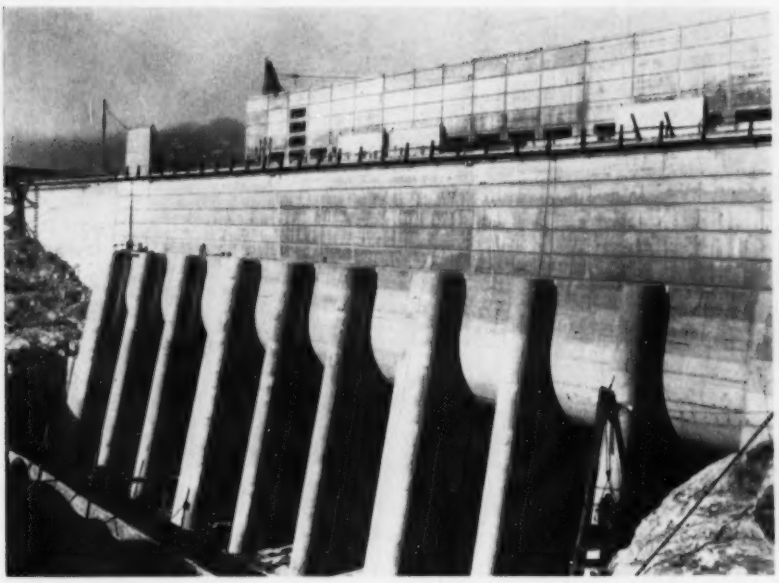
Portland District Army Engineers

The Portland District, Corps of Engineers, has four projects in operation or under construction that include power development. Bonneville Dam on the Columbia River, 42 miles east of Portland, has been producing power since 1938, and is fully installed. Under construction are Detroit project on the North Santiam River, 45 miles southeast of Salem, Ore.: Lookout Point project on the Middle Fork Willamette River, 22 miles southeast of Eugene, Ore.; and The Dalles Dam, three miles east of The Dalles, Ore.

Detroit Dam and power house are essentially completed with the two 50,000-kw units in operation. The Big Cliff Dam, 2.8 miles downstream, is completed to the point where reregulation of Detroit outflows is performed. Installation of the 18,000-kw unit at Big Cliff is progressing and generation is scheduled for April 1954.

The Lookout Point project is nearing completion. Work on the main dam and concrete spillway is about 95% complete, and the power house structure is about 47% completed. Turbine scroll cases are being installed for each of the 40,000-kw units and power is scheduled to go on the line in October 1954. The Dexter reregulating dam and power house, 2.7 miles downstream, are about 40% completed. Reregulation of the Lookout Point outflows is scheduled to start in September 1954, and power from the 15,000-kw unit is scheduled to go on the line in April 1955.

Construction was in progress on all phases of the work at The Dalles Dam during 1953. Rough excavation for the power house and construction of the cofferdams enclosing the power house area are scheduled for completion by the end of 1953. A contract providing for completion of excavation and construction of power house substructure for 14 main units, two fishwater units and an assembly bay was awarded in June 1953, and is scheduled for completion in December 1955. Contract



Albeni Falls Dam, Army Engineers, will have first 14,000-kw generator on line this fall

for fourteen 123,800-hp turbines was awarded Baldwin - Lima - Hamilton Corp. during December 1952. The scheduled completion date on this contract is June 1959. Allis-Chalmers Mfg. Co. was successful bidder for the two 18,000-hp fishwater turbines. The contract was awarded in October 1953 and is scheduled for completion in May 1956. Contract for intake gates and appurtenances to the power house was awarded in December 1953 and is scheduled for completion in July 1956. The spillway dam contract was awarded in October 1952 and is scheduled for completion in December 1955. Contracts have also been awarded to construct a shoofly for the Spokane, Portland and Seattle Railroad around the dam axis on the Washington shore, and for relocations of segments of the Union Pacific Railroad and U. S. Highway 30 along the Oregon shore.

Portland General Electric

The amount of the 1953 construction budget was $8,500,000. Estimated requirement for 1954 is $10,000,000 of which $2,200,000 are for new generation capacity.

The 1952 December peak with load curtailment was 525,000 kw. The 1953 December peak without load curtailment was 568,000 kw.

The 1954 estimated construction requirements cover the following major items:

Construction of a 60,000-acre-ft storage reservoir at Timothy Meadows on the Oak Grove Fork of the Clackamas River. This storage will be usable at the company's Oak Grove, Cazadero and River Mill plants.

Increasing the company's tie capacity with the BPA system. This program involves completion of the 50,000-kva 115/57-kv interconnection at St. Helens, installing a second 57-kv breaker position for the 125-kva 115/57-kv interconnection at Chemawa and building a 795 MCM ACSR line from BPA-Oregon City substation to reinforce the company's system in the southwest Portland area.

Installation of 27,150-kva capacity in shunt capacitors for power factor correction; 18,000 kva of this capacity will be of the switched type installed at substations, and 9,150 kva will be of the fixed type for pole installation on distribution feeders.

Reconstruction of five hydraulic turbines at station G by replacing the old cast iron casings with new fabricated steel casings. The decision to replace all five casings was made after an analysis had been made of the cast-iron casing for unit No. 3 following its failure in service.

Reinforcing the 57/11-kv transformer capacity by installing two 50,000-kva transformers at station L and reinstalling a 15,000-kva unit removed from station L at station E.

Adding one 3,000-kva 57/4.15-kv unit substation for Portland distribution and revamp bus and switch structure for four 4.15-kv feeder installations at Knott substation.

Adding 33,500 kva to the company's 60/12.5-kv stepdown capacity and continuing the 12.5-kv cutover program in outlying areas.

Making two manual substations automatic by installing necessary automatic control and supervisory control equipment. Also, making two hydro plants semiautomatic.

Reinforcing distribution capacity in west Portland by installing two 500 MCM submarine cables and completing program for serving West Side a-c underground network by means of eight regulated radial 11-kv feeders from station L.

Providing additional division headquarter facilities.

Converting part of radio network to 153 mc and 48 mc. Also install first step in future microwave installation. *—John Banks, chief engineer.*

Utah

Telluride Power

During 1953, $200,000 were spent for betterments and a like amount is budgeted for 1954. System peak for 1953 was 16,140 kw, up 585 kw over the year previous. Planned for 1954 are 60 miles of transmission, 25 miles of distribution, 15,000 kva in transmission substation capacity and 1,000 kva of new distribution substation capacity.*—Paul P. Ashworth, chief engineer.*

Utah Power & Light

Utah Power & Light Co. expenditures in 1954 will reach an all-time high, $24,500,000 being budgeted for this year, compared to approximately $13,000,000 spent in 1953. The largest portion of these expenditures, $15,400,000, will be for thermal-electric generating stations, with $1,030,000 being budgeted for hydro, $2,500,000 for transmission lines and substations, $4,890,000 for distribution lines and substations and $675,000 for general items.

The major amount of money budgeted for thermal-electric generating capacity is for 166,000 kw of new steam-electric capacity. Utah Power & Light is now actively engaged in construction of two new steam-electric plants. Construction of Carbon plant with a 66,000-kw 1,250 psig 950 F preferred standard unit is now well advanced, and the plant is scheduled for operation by December 1954. This mine-mouth plant will be located at Castle Gate, Carbon County, in the heart of the Utah coal fields. Considerable power from this plant will be utilized in the coal mining region and surplus power will be transmitted to the Salt Lake area over existing transmission facilities. This will result in considerable savings in freight and transmission losses, as the present electric re-

Air view and interior of Puget Sound Power & Light's Rock Island plant where Chelan PUD has added 135,000 kw in six generators

quirements of the Carbon County area must be imported.

The second plant under construction is the third section of the Gadsby plant in Salt Lake City. It will be a 100,000-kw preferred standard unit, 1,450 psig, 1,000 F with 1,000 F reheat, designed to burn coal, gas or oil. Piling for this plant has been driven, the concrete mat has been placed and work on the structure is well under way. Operation is planned for June 1955.

The No. 2 75,000-kw unit at the Gadsby plant was converted to burn gas in the latter part of 1953 and the 44,000-kw No. 2 Hale unit is now in the process of being converted.

Another 1,000-kw diesel unit is scheduled to be added to the isolated Vernal system during 1954.

Expenditure of $562,000 during 1953 for improvement to hydro facilities included $300,000 for 12,000 ft of 28 in. diameter flow line and a 870-kw unit at the Upper American Fork plant.

The program for improving flow lines and other hydro facilities will continue. Items in the $1,030,000 budgeted for 1954 include 14,360 ft of 5 ft diameter steel pipe line at the Hyrum hydroelectric plant estimated to cost $500,000, and at the Grace hydroelectric plant 750 ft of new 6½ ft diameter steel penstock and a new 15-ft surge tank 116 ft high, estimated to cost $100,000.

Transmission line extensions and increases in transmission substation capacity during 1953 cost $1,475,000. Included are approximately $108,000 for 31 miles of 44-kv line connecting the town of Moab to the interconnected system at Crescent Junction. Prior to this, Moab was served by small hydro and diesel plants. Transmission expenditures in 1954 will be increased to $2,500,000.

Extension of distribution facilities to new customers and improvements of existing facilities in 1953 cost $4,522,000.

A second electric furnace at Monsanto Chemical Co. for production of elemental phosphorus at Soda Springs, Idaho, is planned for service in 1954. Utah Power & Light Co. will supply power to this furnace, which will have an electric demand of 30,000 kw, 90% of which is interruptible. This furnace will be identical to the first furnace which commenced operation in the latter part of 1952.—*E. A. Hunter, assistant to vice-president.*

Washington

Chelan County PUD

On the distribution system of the district, planned construction for the year 1954 includes one new 3,000-kva substation with approximately two miles of 33-kv line to connect the present system.—*C. H. George, manager.*

Chief Joseph Dam Army Engineers

Progress of Chief Joseph Dam on the Columbia River near Bridgeport in north-central Washington continued on schedule during 1953. At the end of the year over-all project completion was about 40%.

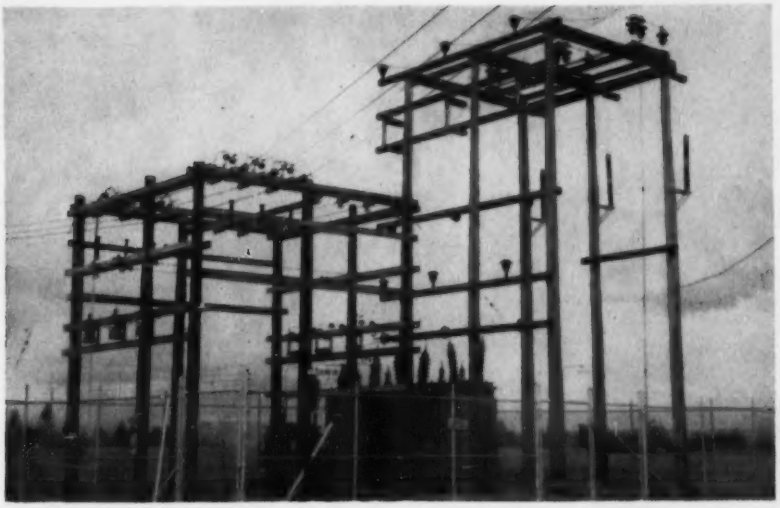
Chief Joseph Builders, contractor for the main dam, placed about 170,000 cu yd of concrete in 1953. Using a special upstream closure gate and a downstream cofferdam, the last low monolith was raised in November 1953, so that all river flow is now passing through the base of the dam in the third stage diversion sluices. At the end of the year, the main dam contract was about 90% complete.

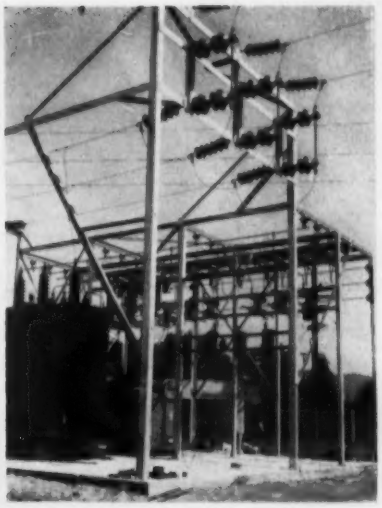
Columbia River Constructors in 1953 placed approximately 450,000 cu yd of concrete in the intake structure and power house. During the year work has progressed on the intake structure; installation of 25 ft diameter penstocks; power house substructure; power house superstructure with the roof being completed by the end of the year over units 10 to 14; installation of turbine embedded parts; and erection of two power house bridge cranes.

In November 1953 a $3,420,023 contract was awarded to Gunther and Shirley Co. and E. V. Lane Corp. for installation of power house equipment. This contract includes installation of turbine rotating parts, transformers, control boards and other auxiliary electrical equipment, heating and ventilating system and the interior finish and painting of the power house.

Contracts were in force during 1953 for procurement of 16 main unit turbines, eight main unit generators, two station service turbines and generators, main unit transformers for 12 generators and for many other items of associated auxiliary equipment.

The Chief Joseph generators will have a rated capacity of 64,000 kw. The first 16 units are scheduled to be on the line by the end of 1958 with the first unit generating by September 1955. This project is designed to have 27 units ultimately for a total rating of 1,728,000 kw.





New substations constituted much of last year's work by Clark County PUD (left) and aluminum structure (right) of Cowlitz PUD

Expenditures for Chief Joseph Dam during fiscal year 1953 totaled $24,591,370; the appropriation for fiscal year 1954 is $23,350,000. Total estimated cost of the project is $186,880,000 of which $81,845,800 have been appropriated through fiscal year 1954.

Clark County PUD

The Clark County Public Utility District continued work on its county-wide rehabilitation program during 1953. The work was first started in 1948 when the district took over the distribution facilities throughout its service area.

During the past 12 months 1,500 poles were set, bringing to 14,500 the total installed in the past six years. This is about 45% of system poles.

The district completely rebuilt one of its substations during the year and added 7,100 kva capacity through replacing and adding distribution transformers. Six 100-amp regulators were installed. Additional automatic reclosers were installed throughout the system also.

Forty miles of the district's distribution lines were converted from 2,400 to 7,200/12,450 v by work crews. More than six miles of new lines were added to the system. An extensive tree trimming and brush spraying program was carried out.

Residential service lines were installed to serve 800 new homes, and 125 new commercial services were added during the year; 390 residential services were changed from two to three wire. The district also added 61 new irrigation customers with a total load of 973 hp.

Customer total at the end of 1953 was 29,350.

Plans for the coming year call for the utility to continue its improvement and rehabilitation program. Line rebuilding, conversion and extension will continue. The district also expects to install street lighting systems for three rural street lighting districts formed during the fall months of 1953 under a law passed by the State Legislature during the year. The statute allows formation of property-tax-supported districts for the purpose of contracting and operating street light systems in unincorporated communities. These three districts are the first formed in the State of Washington. — *V. M. Cleaveland, manager.*

Columbia Basin Project, USBR

Installation of units P-5 and P-6 of the Grand Coulee pumping plant was completed in May, bringing the plant's pumping capacity to six units of 1,350 cfs each. (Full installation of the plant is to be 12 pumps.) Structures completed during 1953 on the project's irrigation system, which is to provide full irrigation service for 55,000 acres in 1954, included the following pumping plants: Babcock, 292 cfs capacity; Ringold, 236 cfs capacity; and Lower and Upper Saddle Gap and PE-17 pumping plants, which have a total capacity of 217 cfs.

Cowlitz County PUD

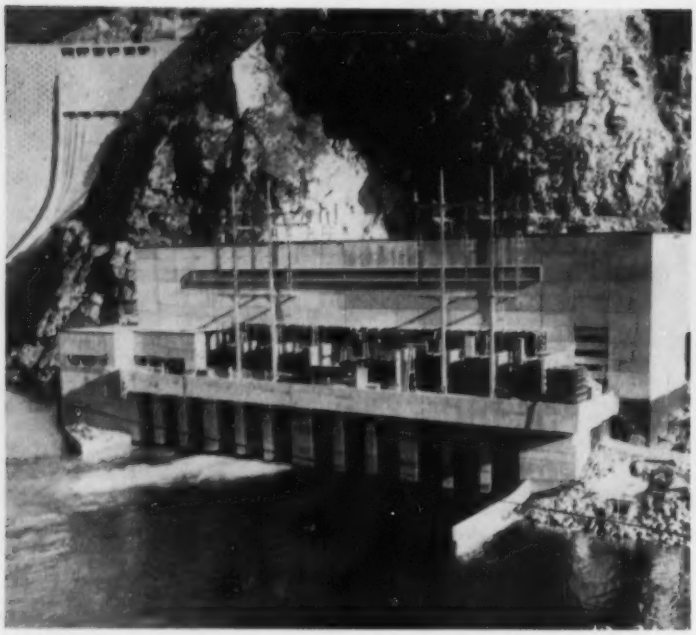
During 1953 the district continued its program of system improvement and enlargement to care for the continuing load growth in Cowlitz County.

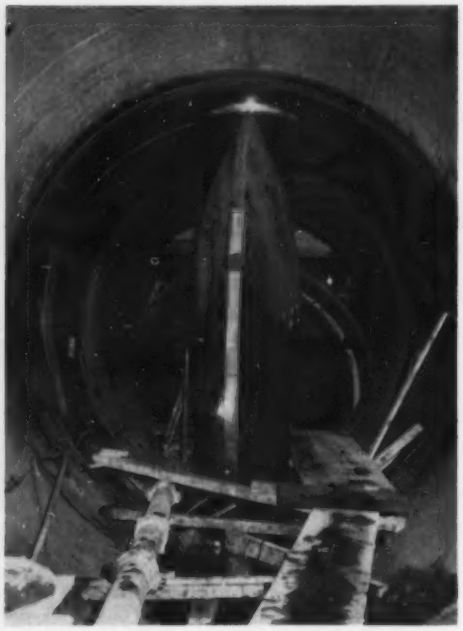
Generating plant improvements consisted of the reconstruction of one boiler by modernizing the entire setting and converting it from hog fuel fired only to oil or hog fuel or both with forced-draft and combustion-control equipment. This improvement cost $85,000. One closed-type generator cooler also was installed.

The 69-kv transmission system was extended by the construction of 2.3 miles of line between the Longview substation of Bonneville Power Administration and a new distribution substation on Washington Way in West Longview. Except for small items such as pole relocation and replacement, no other transmission projects were carried out.

Distribution substation enlargements were made at Kelso where the capacity was increased by 1,500 kva to a total of 9,000 kva. A new substation was constructed in West Longview at 30th and Washington Way with a capacity of 7,500 kva. Substation B in Longview was increased to 2,000 kva and forced-air cooling was added at the Olive Way substation increasing its capacity by 1,200 kva to 5,000 kva. A feature of the district's substation structures recently erected and planned is that structural aluminum is used throughout at the same cost as steel. It is expected that maintenance costs will be much less than would be the case with steel structures.

Distribution extensions and improvements, totaling some $600,000 aside from substations, were continued by additional conversions to 12.5 kv and by extensive pole replacements, so that as of the end of 1953 all of the distribution outside of the limits of Longview, Kelso and Woodland is now 7.2/12.5 kv and some of the 2.4-kv distribution within these cities has likewise been converted to the higher voltage. The major extension constructed during the year was to Camp Baker of the Weyerhaeuser Timber





Ross power house and 180-in. butterfly valve on Skagit River development of Seattle City Light. Plant capacity will be 270,000 kw

Co., bringing service to this large and permanent logging operation as well as extending service into additional rural and recreational areas in Cowlitz County. Numerous other small line extensions were constructed to serve area growth and irrigation.

General system additions and improvements consisted largely of a rearrangement of the central warehouse and operating headquarters on K St. in Longview. The largest items in this respect were the construction of a truck port separate from the main warehouse building; a transformer repair and testing shop; and a covered loading dock as an enlargement of the main building. An Industrial Monkey was acquired and placed in service; also certain vehicles were replaced.

The program for 1954 will in general be that of continuing the strengthening and expansion of the transmission and distribution system. An additional three miles of 69-kv transmission is planned so as to complete the 69-kv loop around the Kelso-Longview area. It is planned to add 15,000 kva of distribution substation capacity chiefly by increasing the size of existing substations. Approximately 12 miles of new distribution line extensions are in prospect and the program of pole replacement and conversion to 7.2/12.45 kv will continue.

No important changes or additions are planned for the generating plant in 1954 and no further enlargements are planned for the main warehouse and operating headquarters. It is expected that plans will be developed for the enlargement of the general office at Longview but no actual construction is presently proposed for 1954.—*O. G. Hittle, manager.*

Puget Sound Power & Light

During 1953 one new 40,000-kva transformer bank was added to a transmission substation at Bellingham and nine new distribution substations, with 34,000 kva transformer capacity, were constructed. Transformer capacity in four substations was increased by 4,500 kva. Three distribution substations with 5,000 kva transformer capacity were retired, making net additions during 1953 of 73,500 kva. Of the $5,500,000 spent on plant accounts during 1953, $4,300,000 were for distribution and $750,000 for transmission. The balance was for improvements at existing steam and hydro stations and for other miscellaneous accounts.

During 1954 the company plans to install a new 40,000-kva transformer bank with associated switching equipment at a new transmission substation located east of Kirkland. Five new distribution substations with a total capacity of 20,500 kva will be built and the capacity of four distribution substations will be increased by a total of 7,000 kva. Two substations with a combined capacity of 5,000 kva will be replaced with two new substations with a total capacity of 12,500 kva. Of the $5,900,000 budgeted for plant accounts during 1954, $4,500,000 are for distribution improvements, $900,000 for transmission line and substation additions and improvements, $350,000 for hydro and steam plant improvements and the remainder is for general plant replacements and improvements. — *Frank McLaughlin, president.*

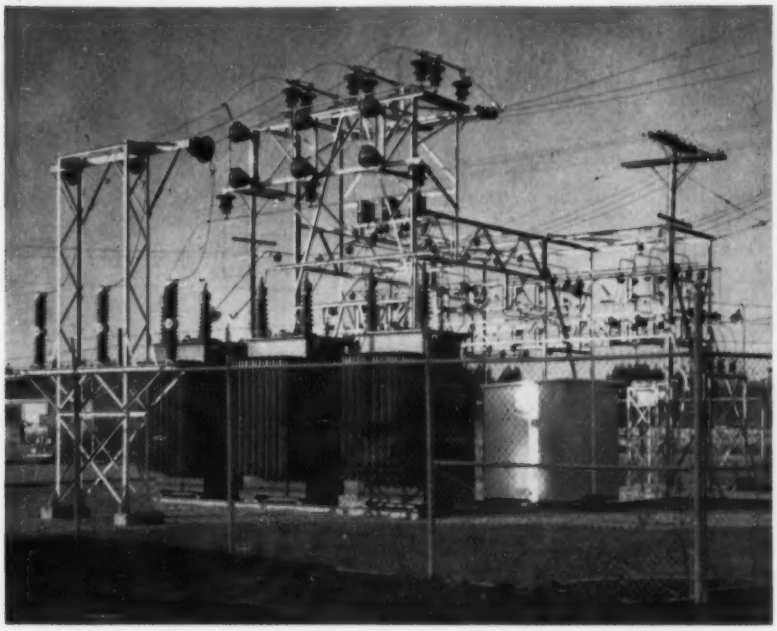
Seattle City Light

During the year 1953 total expenditures for plant additions amounted to $16,360,000. Continued work on the Ross hydro plant accounted for $12,500,000; transmission $750,000; distribution $2,750,000; and general plant $360,000.

Installation of generating units at the Ross power plant continued during 1953. The first unit was completed on Dec. 30, 1952, the second went on the line April 23, 1953, and the third unit was scheduled for December 1953. It now appears that the third unit will not be ready for commercial operation until about Jan. 15, 1954.

Construction of new employee housing and community facilities to take care of personnel at the Ross and Diablo plants was completed during 1953. This project is located near the Diablo plant and consists of 36 new four-bedroom houses, a new commissary building along with water, electricity and sewage facilities and landscaping.

A new 115/26-kv 62,500-kva transformer bank was installed at the North receiving substation during the year and two similar banks have been received for the new Shoreline receiving



Trosper substation, Puget Sound Power & Light, typical of 3,000-kva automatic stations

substation, which will be completed in 1954.

Additions to the distribution system included about 25 circuit miles of 26-kv line and 39 miles of 4.3-kv primary distribution circuit. About 57,000 kva of distribution substation capacity were added.

Plans for the expansion of plant in 1954 include completion of the Ross plant. It is also planned to start construction of a new concrete dam on the intake of the Gorge power plant on the Skagit River. This construction will consist of a concrete dam below the existing diversion dam, which will increase the head on the existing Gorge plant by about 90 ft, allowing an increase of about 50,000 kw in the capability of the plant. All of the units in the Gorge plant have been designed for the ultimate use of the increased head. Plans also include installation of the fourth and final generating unit at the Ross plant. This will provide a total installed capacity of 360,000 kw at this plant, which will have a maximum peaking capability of 440,000 kw. Both of these projects will require approximately three years to complete.

The new Shoreline receiving substation will be under construction during 1954, along with a start on a new receiving station in the southern part of the service area, which will be called the Duwamish substation. Approximately 60,000 kva in distribution substation capacity also will be added.

Total estimated expenditures on new construction during 1954 are $11,795,000, of which $6,500,000 will be spent on new hydro facilities; $2,000,000 on transmission substations; $3,245,000 on distribution lines and substations; and $50,000 on general plant additions.—*E. R. Hoffman, superintendent of lighting.*

Snohomish County PUD

The Scott Paper Co. is expanding its facilities in Everett. To serve them, substation will ultimately consist of two 15,000-kva, three-phase, 110/12-kv transformers with forced-air cooling for emergency rating of 25,000 kva each. At present a 7,500-kva, 55/12-kv substation is temporarily serving the initial load.

In 1953, $1,518,000 were spent on betterments; for 1954, $2,500,024 are budgeted. System peak for 1953 was 95,786 kw, up 10,522 kw or 12.4% over the 1952 peak.—*A. S. J. Steele, manager.*

Tacoma City Light

During the closing months of 1953 both the state and federal courts rendered decisions favorable to the City of Tacoma's proposed Cowlitz River power development. In the first case, Washington State Supreme Court ruled in favor of the city and remanded the case to the lower court for procedure. This case was brought by the city for testing the validity of the proposed issuance of revenue bonds.

The other case was started by the Washington State Department of Fish and Game to appeal from the action of the Federal Power Commission in granting the city a license to proceed with the Cowlitz River development. The Ninth Circuit Court of Appeals ruled in favor of the city and the Federal Power Commission. The state department has since appealed this ruling to the U. S. Supreme Court.

The year 1953 saw the construction of water walls and resulting increased boiler capacity at steam plant No. 2. Installation of a 25,000-kw name-plate rated hydrogen cooled generator is progressing, and completion expected in the third quarter of 1954.

A major 230/115/52.5-kv receiving substation was completed during the year to serve as a terminus for a 230-kv interconnection with the Bonneville Power Administration. Ultimately this new substation will be the terminus for the Seattle-Tacoma interconnection at 230 kv, and for the proposed Cowlitz River power development. Also terminating at this new substation are the 115-kv lines from the city's Nisqually plants. A 40,000-kva synchronous condenser is now operating at this site.

Gross generated and received kilowatt hours amounted to 1,680,626,000, an increase of 8.32% over 1952. Peak requirements amounted to 298,000 kw. —*J. Frank Ward, superintendent.*

Washington Water Power

The new year will see the Washington Water Power Co. utilize more than $4,000,000 for new and improved facilities to serve its 125,000 customers in Washington and Idaho.

Last year WWP spent $10,927,700 for such purposes, including the completion of the Cabinet Gorge project on the Clark Fork River in northern Idaho. There the firm had put the station's third 50,000-kw generator on the line Feb. 7, and its final unit on Aug. 17. The plant, Idaho's largest, is now producing 230,000 kw for the power-hungry region.

During 1953 WWP had expended $4,700,000 for new and improved service facilities on the present system, including the building of nine new substations and increasing capacity in another eight. Altogether, an addition of 202,500 kva of transmission substation capacity (the bulk of it due to the installation of final units at Cabinet Gorge) was made, and 100,200 kva of distribution substation capacity were added.

The company built 41 miles of new transmission line with 110-kv portions linking new substations in Spokane, and installed a 27-mile 60-kv circuit from Kamiah to Grangeville, Idaho. WWP also added 83 miles of rural lines, along with numerous other

items of general construction throughout its system.

The construction budget for 1954 is set at $4,053,600, with a strong quarter of it earmarked for a pair of major transmission line projects. The largest of these will be the strengthening of the southern portion of WWP's transmission grid through installation of a 110-kv circuit from Lewiston to Nezperce, Idaho. Calling for an expenditure in excess of $600,000, the project will include the building of 28 miles of new line, the reframing and reinsulating of nine miles of existing 60-kv line for 110 kv, and reinsulating another 12 miles with the same voltages involved. It will also be necessary to build two new 110/13-kv substations as part of the work.

In Spokane, the company will construct a 230-kv wood-pole circuit, approximately six miles in length, between the Beacon substation and the Bonneville Power Administration's Bell substation at Mead. This would form the major tie between the two power suppliers and augment three existing 110-kv lines. The project will cost about $426,000.

Another 4.8-mile 110-kv line from the Greenwood switching station to the Sunset substation in Spokane will be built to complete a 110-kv transmission loop around the city, improving service to Spokane and the nearby area to the south.

At the Long Lake power plant on the Spokane River, power supply crews will install two new 110-kv oil circuit breakers and rebuild eight others to increase interrupting capacity.

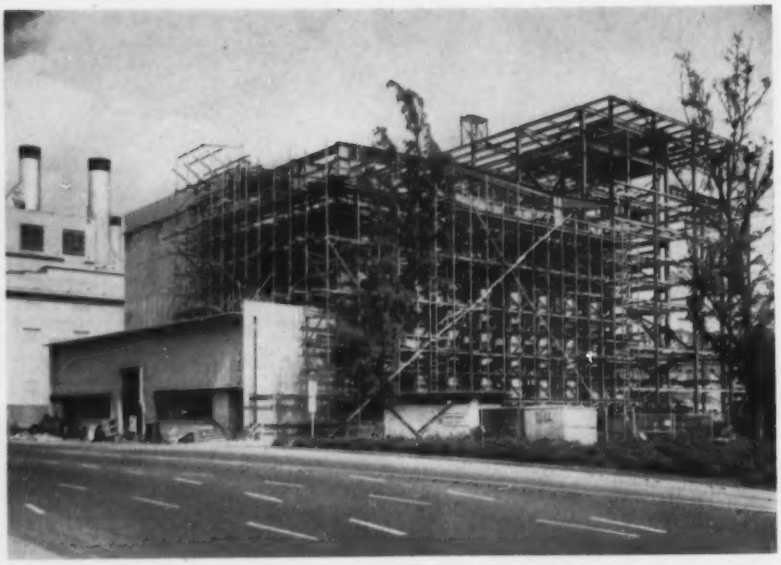
Throughout the system, distribution substation transformer capacity will be increased 42,250 kva. This will be accomplished by building three new substations, increasing capacity of four others and installing fans on transformers in five others. Five new regulator stations will be built.

About 97 miles of new rural lines will be constructed, including 30 miles in the Columbia Basin area and another 25 on the North Fork of the Clearwater River near Orofino, Idaho. Another 14 miles will be rebuilt.

General expansion and improvement of the company's water system at Clarkston, Wash., will cost some $127,000.

Yakima Project, USBR

Construction of the Chandler power and pumping plant on the project's Kennewick Division in the Kennewick-Pasco-Richland area, was started in July 1953. This installation comprises two 6,000-kw generating units in the power plant and one 500-cfs turbine-driven pumping plant having an initial two and an ultimate three 167-cfs units. The associated Chandler power canal, eight miles long, was about 50% complete by the end of the year.



Steelwork for Honolulu unit No. 8, a 50,000-kw addition for the Hawaiian Electric Co.

Wyoming

Missouri River Basin Project, USBR

See report under Montana.

Hawaii

Hawaiian Electric

During 1953, $6,700,000 were expended for new and improved facilities by The Hawaiian Electric Co. Ltd. Three and one half million dollars of this money were spent on construction of Honolulu unit No. 8, a 50,000-kw addition to the steam generation capacity of the system. This unit is scheduled for completion early in 1955. The duct line for the 44-kv cables from this new unit to Iwilei and School St. substations was constructed in 1953.

The 44-kv system was extended 3.25 miles and the first half of a 7,500-kva, 44/4-kv duplex substation was installed in Kahala, the second half of a 7,500-kva, 44/4-kv duplex substation installed at Kaimuki substation, a 1,725-kva, 44/4 CSP substation in Kalihi Valley, a 2,000-kva, 44/4 CSP substation in Pauoa Valley, and a 1,000-kva bank added in Kaimuki to supply the transportation company's substation from the 44-kv system. A 5,175-kva, 44/11-kv transformer bank was moved to Ewa substation to supply the increased load in that area.

Supervisory control of Iwilei and School St. substations from the dispatcher's office was installed in 1953.

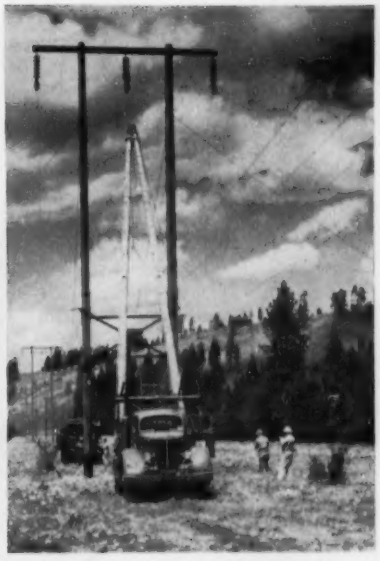
Included in the $9,307,000 budgeted for 1954 is the continuation of the 50,000-kw turbine-generator addition in Honolulu, installation of three 44-kv low-pressure gas-filled cables from the Honolulu power plant to Iwilei and School St. substations, the construction of three new substations and the increase in capacity of five existing stations. Carrier current relaying will be installed on the major transmission lines and Koolau substation will have supervisory control from the dispatcher's office.—*L. W. Lengnick, vice-president and executive engineer.*

Alaska

Eklutna Project, USBR

This project is to provide defense and industrial power for the Anchorage and Palmer areas. Completed in April was the 26-mile, 115-kv Eklutna-Anchorage transmission line. The 4.5-mile-long Eklutna power diversion tunnel was holed through in October. The tunnel was about 85% complete by the end of 1953.

Construction of the Eklutna power



Four-unit, 200,000-kw Cabinet Gorge plant of Washington Water Power is complete. At right, 110-kv transmission line near Spokane

plant, which will house two 15,000-kw generators, neared the midway point of completion by year's end. The first generator is expected to go on the line in October 1954; the second unit is scheduled for January 1955.

Canada

B. C. Electric

The electric facilities of the B. C. Electric Co. Ltd. continued to expand in 1953 when an expenditure of $20,000,000 was made on new plant. Load growth continued with the mainland system peak load in December reaching 384,200 kw. This compares with 351,600 kw in December of the previous year and is in addition to power exported to the Northwest Power Pool. Energy generated for system use during the year was 9.4% above the year 1952.

With the completion of the 75,000-kva Wahleach unit in December 1952, no new hydro generating facilities were required in 1953, but the electric system of the villages of Ashcroft and Spences Bridge in the upper Fraser Valley were purchased during the year and small diesel units added at both locations to improve service until they can be connected to the transmission system.

In the Vancouver metropolitan area, the Dal Grauer substation with two 25,000-kva transformers to serve the growing load of the city's downtown district was put into service. Additions were made to other stations including a 20-mva transformer at Sperling, a 15-mva bank at Barnard and a 66-mva 230/60/12-kv and 10,000-kva 12/4-kv transformer at Horne-Payne. Five 1,500-kw glass bulb mercury arc rectifiers, two at Sperling Annex, two at Fir Street and one at Haro Street went into service to supply transportation power and to replace rotating equipment.

In the Fraser Valley, a new 3,000-kva delta substation at Ladner and a similar one at Maple Ridge provide for load growth in those areas and relieve the load on other stations.

In North Vancouver, a second 9,000-kva 60/12-kv transformer bank was installed.

A six-mile 60-kv transmission line was built from Wahleach generating station to connect with other transmission facilities in the eastern end, and an 11-mile 60-kv extension built to serve the Delta substation in the western end of the Fraser Valley. The year also saw the initial operation of the 60-kv aluminum-sheathed, gas-pressurized cables for supply to the Dal Grauer substation. An active start was made on a second circuit from Bridge River to connect with existing facilities at Wahleach generating station. To be completed in 1955, the line will operate initially at 230 kv but is being built with twin conductors for later operation at 345 kv.

This year will see the installation of the fourth 62,000-hp generating unit at Bridge River and a start made on construction for a 58,000-hp unit at Seton Creek for operation in 1956.

Facilities in the Vancouver area will be enlarged with expansion of existing stations and a start made on construction of another major ring substation for operation in 1955. A second 30,000-kva synchronous condenser will be installed at Horne-Payne, for operation with the new Bridge River generating unit.

On the North Shore, a 6,000-kva Hillcrest substation will go into service to supply the West Bay area and the West Vancouver station will be rebuilt and enlarged with two 60,000-kva transformers to receive power at 60 kv instead of 34 kv as at present.

For the Fraser Valley, a 6,000-kva substation at Mission will replace a smaller temporary station and the Chilliwack station will be enlarged from 6,000 to 10,000 kva.

A 40-mile 60-kv transmission line will be built between Lillooet and Lytton in the upper Fraser Valley to supply a small substation and to permit the shutting down of diesel units at the latter village.

On the Vancouver Island system load growth continues at a rate slightly greater than on the mainland. In 1953 a 6,000-kva, 60/12-kv Langford substation was placed in operation to serve the Langford Lake and Metchosin areas. In 1954 the second and third 20-mva 60/12/4-kv transformers will go into service at Bay St. substation to replace smaller banks. This year will also see a start made on extension of our 132-kv lines and construction of another major substation to supply load requirements in the city of Victoria.

Plans for Vancouver Island, as well as for the Mainland, also include many minor additions and changes for improved service.—*T. Ingledow, vice-president and chief engineer.*

What cooks? On the home range the cooking school, such as this conducted by California Electric Power, will boost sales in 1954

1953—Great Changes—Now Comes

— because here's what's

Is it going to be as good as the predictions have been saying it will be in 1954? By now, a month later than the flood tide of predictions, made by everyone from the President on down to the local chamber of commerce, this realistic question comes to mind. The "rolling adjustment" seems to be rolling. How far will it roll and will it roll back again? Everyone in the electrical industry wants the answer to such questions—electrician, salesman, dealer, contractor, distributor, manufacturer and utility, consulting engineer, inspector, agent and service man.

Opinions and predictions have a cautiously optimistic note. Boiled down they say: "Nothing wrong with '54 that a little work won't cure."

Of this an editorial in *Printer's Ink*, "Sell hard—but make it easy to buy, too," puts this twist to it:

"While opinions differ on trends, there's one important point of agreement in practically everything we've seen—consumers are ready, willing and able to buy, but business will have to woo them, because selling is all that's needed.

"Part of that selling job, as we see it, will be to **stop making it so hard for people to buy.** There is need for

Plenty of power
No restrictions on sales due to implied or real power shortage, as more generating capacity comes into use.

Selling plans revived
Restaffing of sales forces, initiation of selling plans and programs.

Electric heat welcomed again
Out from under wraps this business will be welcomed again because of . . .

Sprinkler irrigation
Which is developing summer peaks that electric heat can balance; also

Natural gas is coming
The Pacific Northwest will begin feeling new competition from gas and oil piped to the area, necessitating strong counter selling to hold the electric load.

Air conditioning advances
Even in mild climated Western areas the national emphasis on window-type air conditioners will be felt. Combination heating and cooling types may be more acceptable. Heat pumps will advance a bit.

Wiring can't take it
So there'll be more honest effort this year to sell the public that it ought to rewire homes in order to use the new appliances.

Construction may slack off 8%
In residential there may be less yet almost as many houses built and to recover profit contractors will need to sell more wiring per house. Commercial and school building will be better in total but

Commercial cooking will receive renewed promotion as it did in this WSC class staged by Hotpoint and Washington Water Power

the Time to Digest Them All—1954

in store for '54

competition very sharp. Industrial building may drop, as well as new military facilities.

Appliance prices

Start out the same as last year but more de luxe features are put on lower priced models, even promotional models, as manufacturers aim at a lower level of purchasing power.

Factory branch distribution

Will be tried by many large appliance makers to put more pressure at the sales end in order to absorb greatly increased production capacities. The fight for the few best dealers will be rough. Where none are available some factory-owned stores may be set up. Utilities will be wooed to get back into merchandising.

Price cutting and discounting

In the cities will continue as stocks from closing stores get into hands of "surplus" merchants, but in country areas farmer conservatism and loyalty to old friends will prevail as always.

Mobile appliances

Will seek to overcome plumbing and wiring installation costs for dishwashers, washers and dryers.

Home lighting swing

The pendulum has begun to swing back from cave interior decor and bullet spots. Light conditioning by the roomful grows nearer.

Mass attack on the market

Will be the salvation of the industry in 1954. Joining with the others in town or area for big promotions is needed to move the public to buy and live electrically in order to match the impact of automotive, furnishings, amusement and other industries.

hard selling, but there is also a great need for easier buying."

In the electrical industry that certainly has been true. Because of wartime controls, restrictions, diversion of materials, shortages, etc., consumers were discouraged from buying by every known means. Yet they bought anyhow, either out of sheer necessity or defiance. In 1954 the change from scarcity to surplus will be made—in electric generating capacity at one end, and appliances and equipment to use it at the other.

The accompanying summary briefs the significant trends in 1954 as distilled from all the year-end predictions, the following letters from utility sales executives, the observations of the editors and the opinions of a number of informed industry people.

Instead of attempting to include in the pages of this issue the usual tables of appliance sales, numbers and classes of customers, kilowatt-hour consumption per residential customer, etc., it has been requested that these be gathered for the March issue when the final figures for 1953 will be available. *Electrical Merchandising* in its January statistical issue publishes comprehensive national figures along these

lines, together with estimates of sales in the territories of individual utilities based on the first three quarters of 1953. The figures to be published next month here will be more accurate as final computations are made.

The following pages, then, contain letters from the sales executives of utilities in the 11 Western states telling their opinions of what business conditions will be like in the areas served by their lines in 1954. While not completely covering the West, these give representative views from all regions and from them a composite can be deduced.

What is of more value to each area is the statement of the sales programs and helps proposed to boost dealer sales during the year. Around these the promises held forth by the predictions can be reached through cooperative effort. With strong competition for the consumer's purchasing power from other industries the individual dealers, contractors and distributors of the electrical industry can only match these other industries and get their share by teaming up to make a stronger impact with big promotions and campaigns together.

In the West this is nothing new. There has been lots of experience over good and bad years, working through electric leagues, associations or bureaus. In today's changed climate of needing to sell, of making it easier for customers to buy, these organizations marshal the talents, brains, ideas and harness the energies of all in the industry to promote electrical living, be it in residences, stores, schools, offices, factories, municipalities or on the farm.

Arizona

"We Can Do it Again"

Arizona Public Service—An $18,000,000 sales goal has been set by the Appliance Merchandisers Assn. in the Phoenix metropolitan district comprising 300,000 consumers, for 1954, the same goal that was set in 1953 and topped by $1,359,509. In the southern district, comprising Yuma, Casa Grande Valley, Bisbee-Douglas and Globe-Miami, the 1953 appliance sales totaled $4,203,130 and are expected to be as good in 1954. In the northern district encompassing Prescott, Verda, Flagstaff, Winslow and Holbrook, the 1953 totals reached $1,791,055 and are expected to be matched in 1954. December was a two million dollar month in Phoenix, the first ever attained.

Radio-participation-home economics shows in Dept. of W&P No. Hollywood auditorium

Refrigerated Cooling Grows

Salt River Power District—For the year 1953 a total of 5,373 more meters was in service as of Dec. 31 than on Dec. 31, 1952. This represented a 15.9% increase. As for the year 1954, on the basis of presently known developments, we anticipate an increase of approximately 90% of 1953, or an addition of about 4,700 meters.

During the year 1953 we enjoyed a large increase in refrigeration cooling installations for both residential purposes and commercial use. A total of 350 refrigeration units was added to our lines during 1953, ranging in size from 3 tons to 20 tons. It is anticipated that 1954 will equal this amount and may well exceed it.

It is our plan during 1954 to cooperate with the dealers in electrical appliances, with special emphasis on the use of heat pumps and electric heating.—*R. T. Harrell, manager, power service.*

California

Stronger Sales Push Planned

California Electric Power—The honeymoon of order taking is over. Competition for the customer's dollar is rapidly growing keener. The potential market will continue to grow.

Recognizing these facts this company, serving east and south of the Sierra-Nevada Mountains, has just now added 30% to its sales promotion personnel, which includes home economists.

Of course, we will continue to provide our regular services, such as advice on rate and power applications as well as pump testing for our industrial and agricultural customers, but the principal punch will be focused on the higher-priced residential and small commercial kwh.

Particularly in face of the mortality of small appliance dealers, we will continue to merchandise direct to residential customers with added sales people and are going far beyond previous methods in sales training. We expect them to carry their own in the way of expense and, of course, add substantially to residential revenues.

We continue our dealer coordination by not less than bimonthly contacts to explain rates and company policies. By these contacts we are also able to learn what the dealer is selling on our system.

One of the most effective public relations and sales promotion efforts we undertake is that by home economists. These women carry on mass demonstrations, school exhibitions and individual home demonstrations. They are on call by the local independent dealers for demonstrations. Their effectiveness in holding customers for the company and obtaining merchandise prospects is well demonstrated by results.

The number of salesmen covering the field of small commercials has been more than doubled. This section will produce the best paying revenues to be had.

The adequate wiring program is really beginning to show results. With us this promotion has been in effect for only about two years, but as interest is stirred up among the architects, builders and contractors the snowball effect is becoming apparent.

Lighting promotion by L. A. Dept. of W&P engineers brings such loads as this 500 kw of lighting on a 14.5-acre used car sales lot

The outlook for new business during 1954 in this area is bright. There will not be the tremendous growth we have experienced in the past three years, but it will continue on a very healthy level. We estimate increased over-all kwh sales at 9% over 1953.—*D. B. Wheelock, commercial vice-president.*

Dealers Are Alerted

California-Pacific Utilities—A brief review of 1953 business activities in the electrical industry in the company's service area may be helpful in forecasting the trend of such activities during the coming year. Various facts in connection with growth of our business during 1953:

1. The total number of electric customers served increased by 7.6% last year compared to a 12% increase during 1952.

2. An increase of approximately 12.5% in electric revenues last year as compared to 15.3% during 1952 indicates the continuation of a substantial rate of growth of customer use of electricity on the company's service area.

3. Domestic customers increased their average annual use of electricity by approximately 6.3% during 1953. Their average use of over 4,600 kwh per customer is proof of the high general acceptance of electrical equipment in the homes of the rural communities served by the company.

4. Electrical appliance dealers on the company's service area increased their 1953 sales of major appliances by nearly 6% over total units sold during 1952. The 1953 sales of units per 100 customers, however, decreased by approximately 10%.

The above data and our comparisons with business activities of our dealer-contractor associates as well as our part of the electrical industry on our service area allow us to make the following observations as to the trend during 1954:

1. The rate of growth in the number of new customers and total electric revenues is expected to level off slightly in accordance with the lower rate of population growth expected for rural communities of the Western states.

2. With the present high saturation of major appliances among our domestic customers, it is expected that the 1954 rate of increase is not likely to differ greatly from the 6.3% increase of last year. This indicates a leveling off trend from the high rates of increase of 11 to 18% for the previous five years.

3. Electric appliance dealers in all parts of the company's service area now have substantial stocks of appliances and are generally exerting greater sales efforts to maintain a satisfactory volume of business.

4. Electric appliance dealers are adding more sales personnel and are becoming interested in sales training materials and programs that will help maintain sales volume in a new highly competitive market.

5. Electric appliance dealers are increasingly more enthusiastic about participating in the company's program of cooperative community electrical equipment and home furnishings shows.

6. It is expected that the appliance dealers' realization that more sales effort and better sales methods will be needed to get their share of the business in 1954 will result in approximately the same volume of appliance sales that dealers enjoyed during the past year. The expected downward trend of prices with the availability of more low-priced models will help dealers maintain a satisfactory volume of business.

7. The substantial rate of growth of the use of electricity by commercial and industrial customers is likely to continue, as industries are increasing the quality of their product, and business places are modernizing their lighting installations.

8. It is expected that the company's substantial rate of increase in energy sales for municipal street lighting will continue, as more communities become conscious of the need of good street lighting for improved community appearance as well as for safety requirements under present-day traffic conditions.

Our company's substantial construction budget provides for the continuation of a highly satisfactory rate of growth of system load, and our field operating management reports that all our dealer-contractor associates in the electrical industry in the company's service area are enthusiastically cooperating with them in their load building efforts.—*E. A. Nickelsen, commercial manager.*

As Good as 1953 or Better

Los Angeles Dept. of W&P—We are very happy to report that the outlook for residential business in our territory for 1954 is very good. Volume of residential construction is expected to be the second highest in our history. A dip of less than 2% from 1953, the highest year to date, plus continued high consumer income, is foreseen.

Our plans for 1954 include continued promotion of appliances with favorable load factor and off-peak characteristics such as water heaters, home laundry equipment, home freezers, electric bedding and the all-electric kitchen. The electric clothes dryer, home freezer and room air conditioner will receive special emphasis. Our wiring reimbursement of $25 for approved electric water heaters will continue as an important sales aid in the promotion of this appliance.

The certified adequate wiring program will be expanded and intensified in contacting prospective home builders and the home building industry groups. In the new construction and remodeling field, the all-electric model home will be a principal objective.

Advertising in trade publications and metropolitan newspapers will be on a similar high level as last year. Direct mail to both the public and the trade is being scheduled.

Our dealer consultants, home economists, architectural planning advisors, display and exhibit personnel, and new construction sales representatives will coordinate their activities with the local electric industry as each sales activity is launched.

The outlook for commercial business is similarly good. Numerous new projects are on the drawing boards and considerable modernization is contemplated. Our plans call for continued promotion of high lighting standards in stores and offices. We will especially stress heavy-duty cooking equipment because of its desirable load characteristics and the high degree of customer satisfaction resulting therefrom.

Customers are accepting the benefits of air conditioning over large parts of our serving area, and we will encourage this both through the trade and through direct sales efforts.

Direct mail will be used in support of our sales efforts for commercial cooking and air conditioning; also for store modernization, including lighting. It is our plan to use this advertising to open the air conditioning buying season ahead of the actual hot weather.

The industrial field continues to hold good promise for the ensuing year. Nearly a thousand acres of property in the San Fernando Valley has just recently been rezoned for industrial use so that plenty of land is now available for this purpose in this desirable area where ample water, labor and transportation facilities exist.

Generally, we will promote better lighting in our industries as an aid to production. Our heating consultants will cooperate with industrial customers to aid them in developing and using electrical applications to solve their production problems, and electric cooking equipment will be promoted for in-plant feeding.

We look forward to a busy and profitable year.—*R. H. Cockfield, business agent, power division.*

1953 Electrical Home Show staged by Sacramento Valley Electric League drew 13,000

Conditions Are Stable

Modesto Irrigation District—Business outlook for 1954 in the Modesto Irrigation District appears to be similar to that which prevailed during the last six months of 1953.

We anticipate a continued growth in load of approximately 7% and feel that conditions in general will be quite stable during the coming year. We do not have any promotional programs planned for this year.—*C. E. Plummer, chief engineer.*

Proof of Progress

Pacific Gas and Electric—The many uncertainties involved in attempting to predict the year 1954 are recognized in publication of our report entitled "Outlook for the Year 1954." However, we have based our estimates upon reasonable assumptions regarding probable conditions that will prevail and have taken into consideration all known factors in developing the estimates. In population, Westward migration continues to be a vital factor. The estimate for increase for 1954 is 438,000 for the state of California, only a small decrease from the previous year. In our report, this is broken down by counties which show an estimated annual gain for PG and E area in 46 counties of 176,000. A total of 56,000 electric customers is expected to be added to the service line, bringing the total to about 1,575,455 by the end of 1954, up 3.7%. The largest gain is forecast for the San Jose division, the second the East Bay division and the San Joaquin division next.

Our residential sales program will continue to be aggressive in stimulating appliance purchases and store traffic for dealers. This will help sustain a healthy economy for manufacturers, distributors and contractors as well. Cooperation through Northern California Electrical Bureau, coordinated dealer help, extensive advertising, home economics demonstrations, participation in fairs, expositions and model homes will be continued.

We estimate a total of 54,600 new single-family homes will be built in 1954 in the area, being only 6% under the 58,300 units in 1953.

The appliance sales outlook forecasts an increase of 1.5% over 1953.

Sales of room air conditioners, which took a jump in 1953, will again register sizable increases. An estimated 140,000 TV sets will be sold, a decline of 1.4% from 1953. Estimated sales of freezers will be 21,500, ironers 7,050, clothes dryers 20,000, ranges 19,000, refrigerators 65,000, room coolers 10,680 evaporative, 2,470 compressor, washing machines 63,500 automatic, 26,500 nonautomatic, water heaters 6,300.

The commercial and industrial sales program will continue to supply free advisory services on industrial power and heating, illuminating engineering, street, highway, sports and aviation lighting. Central and northern California's tremendous population increase has resulted in substantial growth of commercial enterprises and the need for more schools. These school construction programs call for 10,000 classrooms a year for the next three years in California. The estimated increase in load from military construction to be continued will be about 177,750 kw and for nondefense load an additional 116,780 kw. The company will continue to promote the influx and expansion of commercial and industrial business throughout the area.

Agriculturally four of the five million acres of yet unirrigated land in California are in northern and central California. The agricultural sales program has always been one of the major programs of the company and will be continued on all fronts. This should bring over $20,000,000 worth of new and replacement farm electrical equipment business in 1954.

All of the economic features shown in the booklet point to an increase of business in northern and central California.—*O. R. Doerr, vice-president.*

Grow Like Geraniums

Palo Alto Electric Dept.—Business outlook for the coming year is several notches above satisfactory. The *rate* of load increase decreased and will continue to do so. For several years the load has increased about 16% per year. This rate appears to be sagging to about 12%, which was considered pretty good until we got used to boom times as a norm. The load factor and operating ratio continues steady.

We do not promote. Our citizens seem to be so thoroughly aware of the benefits of electrical living that we just grow like a geranium. We don't need any advertising fertilizer. About half of the new houses being built are wired for electric ranges, which is a realistic appraisal by a realistic group that Mrs. Public is going to want an electric range in her home.—*E. A. Heath, chief electrical engineer.*

Air Conditioning Will Boom

Pasadena Municipal Light and Power Department—We have not had an active promotional program in the electrical appliance field this past year. We have, however, maintained our range wiring program where a minimum range installation charge of $20.50 is made; however, in more complicated jobs the charge is more. We have a small display room where the dealers may show their major appliances.

This past calendar year 320 electric ranges were installed and 74 electric water heaters. We have no figures available for the other appliance sales.

The system kwh sales are up approximately 8% and the peak demand has been 72,000 kw. The increase in residential consumers is approximately 1,000.

We believe in 1954 air conditioning equipment will be the dealers best item. The utility's biggest headache will be supplying three-phase power for this equipment in residential areas.—*F. V. Frey, supervisor, customer service division.*

Will Back the Industry

Sacramento MUD—Our 1954 load building program calls for an expanded campaign promoting electric ranges through our "Why I Want an Electric Range" contest. Electric dryers will receive more support this year as a major campaign for the fall season.

Other promotional activities will include more adequately wired homes in subdivisions, cooking schools, classroom demonstrations, appliance sales training, commercial cooking, plus a bigger and better Electrical Home Show.

We feel that this integrated program will be an effective means of supporting the electrical industry in the district's service area.

In our opinion the new year will equal the generally excellent twelve months that have just passed for Sacramento dealers.—*R. L. Dunshee, manager, commercial department.*

George A. Hughes award for electric kitchen promotion for 1952 was presented to J. H. Adams, Southern California Edison residential sales coordinator, center, by D. R. Anneaux, Hotpoint Co. utility manager, right, at EEI convention. Harry Restofski, West Penn Power Co. vice-president, left, was chairman of the awards committee of EEI

No Letdown Foreseen

San Diego Gas & Electric—Our sales promotion plans contemplate the expenditure of advertising funds to the extent of approximately $175,000 in the electric department. This represents approximately .7 of 1% of the gross revenue from sales of electricity as estimated for 1954, and is on approximately the same ratio as was our 1953 budget. Most of the expenditure will be made in the form of cooperative advertising over the signature of the Bureau of Home Appliances of San Diego County.

I believe the members of the bureau are reasonably optimistic about the coming year; however, they realize that it is going to be a more competitive market than they have experienced in the past and is going to require a greater selling effort.

San Diego Gas & Electric Co. ex-

In Pueblo, Southern Colorado Power relighted both Northern Ave., above, and Main St. with mercury units, replacing outdated concrete posts with a ball-type luminaire

Public Service Co. of Colorado's President John Loiseau greets his 250,000th customer

perienced the greatest gain in new customers added to its lines during 1953 in the history of the company. This tremendous increase in demands for gas and electric service made it necessary to provide distribution facilities at a record rate all during the year and, furthermore, required the planning for expansion of its transmission and generating facilities during the years to come.

It is expected that the final results for 1953 will show a net increase of 15,700 electric customers and 13,600 gas customers. While it is not anticipated that this rate will continue through 1954, because of a considerable falling off in the rate of starts in new building, there is still a sizable backlog of buildings under construction, which have not yet been served. Preliminary estimates indicate that the company will gain some 13,000 electric customers during 1954.

Coupled with this large increase in customers, there has been a continued increase in use per customer, from 2,244 kwh in 1952 to more than 2,300 kwh per customer in 1953. While these two factors, customer gains and increased usage, result in increased sales and increased revenues to the company, at the same time it entails a large investment in added facilities to provide the service. These are reported separately in the engineering section.

Gross revenues for the sale of gas and electricity are expected to total $36,300,000 for the year 1953 and it is estimated that they will increase to $40,000,000 in 1954.

As to factors which may affect the electrical business in this area, obviously the two largest are the Navy establishments in and around San Diego, and the aircraft manufacturing plants. Present trends do not indicate any major letdown in naval activities and some of the larger aircraft manufacturers are still talking about a slight increase in pay roll during the coming year.—*H. G. Dillin, executive vice-president.*

To Digest the Influx

Southern California Edison—1954 in southern California will be the beneficiary of a climactic 1953 in residential construction, industrial expansion, in-migration as well as natural increase in population, employment and increased debt, both public and private.

1954 appears to be a year of taking stock and getting our electrical industry house in order. Prospects for business will be good for those who are willing to go after it; however, competition promises to be keen and selling of a high order will be necessary.

The addition of many new industries, plus an increase of over 90% in population in the last 12 years, takes time to assimilate. These new people will need service installations such as stores, restaurants, schools, markets and recreation facilities to take care of the many new centers of population that have grown up during the past four years.

Business signed in 1953, exclusive of residential new business, was estimated to produce 9% less revenue and 11% less horsepower than was obtained in 1952. Due to the carry-over of business under negotiation, our estimates for 1954 have been set at approximately the same as our 1953 accomplishments in the matter of revenue and horsepower to be connected.

The coming year will see the development of many kinds of businesses featuring service to the public, with the resultant opportunities for electric equipment, ranging from better lighting to air conditioning and food preservation equipment. The room cooler and the complete air conditioner appears to be the big item for popular public acceptance. We look forward to a rapid increase in the sale of this type of equipment.

Although 1954 will be a buyer's year, the sellers should not do too badly.—*H. C. Rice, director of sales.*

Colorado

Help With Wiring Cost

Colorado Central Power — We expect business in our service area to be as good or better in 1954 than it was in 1953. This applies to both kilowatt-hour and appliance sales. The outlook for new home building is good.

We do not merchandise. However, we do cooperate with appliance dealers by paying part of the wiring installation costs of electric ranges and dryers. This program, which we plan to continue, has helped materially to increase sales. Major appliance sales in 1953 were better than in 1952 for

American Indian housewife, Mrs. Plainfeather, in Huntley, Mont., cooks electrically as Yellowstone Valley Electric Co-op now supplies power for it and several more appliances

the dealers who industriously worked at selling. With the same effort in 1954, sales should be good.—*Lawrence L. Gann, commercial manager.*

Commercial Building Active

Public Service of Colorado — The general consensus in Denver is that business looks good here for the coming year. There may be a 5 to 8% decrease in the general business level, particularly in agriculture and manufacturing industries. However, there will be substantial increases in production of oil, molybdenum and uranium. We expect a 20% reduction in home building. Commercial building is very active and will continue throughout the year.

We feel that active promotional programs, which we plan to carry on with the cooperation of dealers and builders, will maintain approximately the same volume of appliance sales that was enjoyed in 1953. Our campaigns will cover bed covering, dryers, water heaters, ranges and residential lighting, in approximately that order during the year. — *G. W. Thomas, general commercial manager.*

Expand Facilities, Manpower

Southern Colorado Power — First, we have just won a franchise election in Canon City by the score of 657 to 6 for a new 20-year franchise. This action preceded the start of construction of a new 16,500-kva steam plant in Canon City. The charter has a limitation of 20 years on a franchise and we did not care to bring to a vote at another election the changing of the charter provision. We have to do some demolition and removal of parts of the old plant in order to make room for the new addition. Construction of the new part should start somewhere around May or June. We also will start building a new 115-kv transmission line right away between Pueblo and Canon City, somewhat paralleling our present 69-kv line to firm up interchange of power between the plants and, of course, the new line will carry most of the power after the new plant is finished in about two years.

We are looking for increased industrial activity in the Canon area in the metallic and nonmetallic minerals field. Generally the industrial growth of the region we serve is looking up and should continue in somewhat the same trend as has been shown in the past 10 to 15 years. There is considerable construction activity in the whole region with the exception of residential construction, which has slacked off from the high peaks reached in the period since World War II. However "shelter" construction is still going ahead even though the huge demand has passed, at least for the present. It looks like good business conditions for at least another year.

Our plans for promotional activities for 1954 parallel closely those of the national picture in the promotion of major appliances. We expect to coordinate advertising and promotional schedules with those set out by NEMA, which, by the way, the sales and promotion committee of the RMEL has also decided to follow as closely as possible in order to take the maximum benefit of national advertising and promotion. We plan special activities on ranges, dryers, freezers and water heaters along with normal activities in the other majors. We plan to follow through with our present activity on home lighting and wiring and will increase as rapidly as possible. We have had a successful year in the promotion of certain traffic appliances, most outstanding of which were the deep fat fryer and broiler rotisserie.

We expect to expand our facilities and manpower for the dealer coordination program in the major appliance field. We have had several retirements and the new appointments will enable us to do a better job.—*E. H. Pemberton, general sales manager.*

Montana

More Industrial Expansion

Montana Power Co.—General economic and business conditions in Montana are expected to continue favorable in 1954, although observers are anticipating some leveling off of the rather sharp gains that have been experienced since the end of World War II. Agriculture, the state's No. 1 income producer, should remain at or near the levels of 1953 which produced the highest production value in history, but the livestock picture is uncertain because of price weakness. Increased copper production is anticipated, due principally to the expanding output of ore from the Greater Butte project and the refining of concentrates from Yerington, Nev., but some other metals, notably zinc, have an uncertain future. A number of new industries will be in operation in the state, including an aluminum plant, two wood-processing plants and chrome and tungsten mills, while the impact of other new industrial operations started during 1953 will be felt. Electric appliances definitely have entered a buyer's market phase and dealers are aware of the need to conduct aggressive sales campaigns—but the Montana Power Co.'s 1953 rural sales campaign has demonstrated that the market is receptive and that appliances can be sold. Television is making an impression on the buying public in three cities. Electric residential, commercial and industrial revenues of the company continue to move upward, and in 1954 it will make major additions in generation and transmission facilities to meet the anticipated growing requirements of its customers.—*D. J. McGonigle, general sales manager.*

Nevada

Keeping Up With Growth

Elko Lamoille Power — This is a small company, as you know, and we do not participate in sales promotional programs. We feel our activities in this respect would have very little effect on our operation. The territory around here should continue to have similar growth in 1954.—*M. E. Lundberg, general manager.*

Biggest Little City Still Grows

Sierra Pacific Power—Business outlook for the year 1954 in the territory served by Sierra Pacific Power Co. should be excellent.

Building plans for Reno and Sparks area call for an expenditure in excess of $16,500,000 even though the year 1953 was a record breaker for construction.

Outside the many and varied commercial and industrial projects, residential construction in Sparks will amount to 150 new homes in the $10,000 class, and Reno will build 100 homes in the $15,000 class and 150 homes in the $10,000 class.

Preliminary sales figures for 1953 indicate a healthy increase over 1952 and 1954 will be better.

As you know, we do not employ campaign or promotional schemes of any sort but feel our dealers will carry the ball just as expertly as they have since 1930.—*A. L. Pierce, new business department.*

Even Better in '54

Southern Nevada Power Co. — It appears to us 1954 in our area will probably be slightly better than 1953, which has been very satisfactory.—*S. J. Lawson, general manager.*

New Mexico

All Growth Continuing

Public Service of N. M., Santa Fe—We believe that there is no particular reason to fear, in this territory, a letdown from the normal growth we have experienced in the past three years, which is approximately a 5% increase in our kwh sales and an approximate 3% increase in the number of customers.

Our activity as to sales promotion is of the dealer cooperation type and is headed in Santa Fe by A. E. Barnes. It is my opinion that the picture, undoubtedly true nationally, of a somewhat tightened-down situation probably will prevail as to retail sales around here. Our better merchandisers, however, are planning for a very normal year.—*Ralph Loken, division manager.*

One of many business district relightings done by Mountain States Power in its area

Utah

Aid the Industry to Sell

Utah Power & Light — We are using the theme "Sell More in '54" this year. Our plan book, just off the press, explaining the entire program to the members of the industry in our territory, employs a new photographic treatment to present our story in a concise and modern way. This program will also be presented to the industry in a series of meetings to be scheduled in the near future.

Quickly to summarize, our book shows that 1954 will see a buyer's market but population has increased 7%, home ownership is up approximately 65%. Our total customers number 185,100 of which 164,300 are domestic, 17,600 commercial in the Ogden, Preston, Rexburg, Salt Lake City, southern Utah and the western Colorado trading areas we cover. Our advertising program will be the biggest in the company's history, using 22 radio stations, two TV live programs weekly, 75 billboards, newspapers, bus cards, etc. Industry will be invited to the area by advertising in national business publications.

To aid the industry do a bigger selling job, our program will continue to cover adequate wiring promotion, displays at shows, fairs, window and floor displays, participation in association promotion activities, line extensions, etc. Sales training will be intensified. We anticipate 4,200 new residential and farm customers, an increased sale of 8,000 electric ranges, 4,500 water heaters, 5,000 freezers, 10,000 refrigerators, 3,000 dryers, 13,000 TV sets and numerous other appliances. Emphasis will be repeated on farm uses of electricity. The power company will keep the industry informed and stimulated by numerous campaigns. The home service department will conduct cooking, homemaking and light conditioning classes before school, church, club and youth groups.

On the commercial and industrial side, a substantial market is available for ranges, bake ovens, miscellaneous cooking equipment, commercial lighting, air conditioning, refrigeration and street lighting. Figures on individual items are in the book. Some totals are: 600 commercial cooking units, 636 air conditioning, 500 refrigeration, 27,000 lighting, 1,200 street lighting units.

Industrially, we anticipate detergent, rubber, uranium, petro-chemical, chlorine and caustic soda plant expansions in our territory. Our commercial and industrial consultants will make personal calls and studies to aid their customers to improve their equipment and to benefit from lighting and automation. In short, the business development staff of the power company will help our allies to "Sell More in '54."—*W. A. Huckins, manager, business development department.*

Washington

Rebuilding and Adding

PUD No. 1, Clark County, Wash.—Residential service lines were installed to serve 800 new homes, and 125 new commercial services were added during the year; 390 residential services were changed from two to three wire. The district also added 61 new irrigation customers with a total load of 973 hp.

Customer total at end of 1953 was 29,350.—*V. M. Cleaveland, manager.*

(Editor's Note—The remainder of Mr. Cleaveland's report covers engineering additions and will be found on p 107. However, at a meeting of the NWPPA in Spokane last year, Cecil Penney, commercial manager, reported on a load-building program the district had been carrying on. Instead of paying part of the cost of wiring for electric ranges and water heaters the district paid commissions on sales by dealers with stores in the district for range and water heater sales to customers where conversion was made from nonelectric to electric. It did not cover sales where wiring was already installed or in new construction. These commissions enabled dealers to offer $50 and $25 wiring allowances in their own advertising. Some 6,000 low-use customers were sent a series of cards advertising the offer dealers made. In a 3½-month period 200 additional ranges and 281 water heaters were placed in service.)

New Highway, New Growth

Cowlitz County PUD No. 1—In our opinion, southwest Washington and Cowlitz County in particular has no reason to expect any substantial degree of reduction in commercial and industrial activity. While it is probable that certain adjustments and realignments may take place in the logging and lumbering activities, there is no indication that these or any other activity will go into a state of noticeable decline. Certain new industrial projects are now beyond the "probable" stage as is also the case in commercial activity. With the great improvement now well along of the primary state highway through Cowlitz County a great amount of new activity is developing all along the highway from the south to the north.

Indications are that residential construction will continue at a brisk pace and additional real estate developments are in progress and in contemplation, particularly in the Kelso-Longview area. Accordingly, we feel that while over-all activity might possibly tend to level off at the same time we have every reason to feel that the business outlook for Cowlitz County for 1954 is excellent.

This district does not directly merchandise electrical appliances but we are and have for the past three years actively engaged in a detailed cooperation and promotional program. We plan to continue this program with considerable emphasis in 1954 stressing particularly the development of irrigation in our agricultural areas and the greater utilization of energy by residential customers through the promotion of range and water heater sales.—*O. G. Hittle, manager.*

Electric Home Aid Continues

Seattle City Light—We are pleased to report that the considerable commercial business and industrial expansion of 1953 has extended into the new year and appears will continue throughout.

As you know, nearly 100% of our new home construction use electric cooking and automatic electric hot water heating. The volume of this new home construction was down for the year. However, we are hopeful that the new proposed legislation will result in a substantial increase over 1953.

Our loss in new home construction was offset by a successful electric range and water heater promotion instituted through the electric and plumber dealers. This program was directed to the electric modernization of the older homes, and resulted in the installation of 1,668 electric ranges and 2,285 electric tank water heaters. We are also pleased to report that our commercial electric cooking and commercial electric water heating promotion resulted in an additional load of 4,700 kw.

On March 1 we will renew our promotion for electric modernization of the older homes. The offer will be the same as in 1953—$30 for installation of an electric range and $25 for installation of 50-gal automatic tank or larger. To be eligible for allowance, electric equipment shall have replaced former flame type.—*J. D. Gawne, electric sales supervisor.*

Back in Business Again

Puget Sound Power & Light—As you know, we have been turning down loads for several years because of the power shortage. I got the go-ahead signal about three weeks ago and the sales directors and I have been busy ever since making our plans.

On Dec. 29 we held an all-day meeting of the sales directors and division sales managers outlining the year's program. Since then, the sales directors and I have been holding meetings in the divisions where we have presented the program to all sales representatives and supervisors including the operating and accounting groups. On Jan. 21 and 22, we will hold a school for the commercial and industrial sales representatives and on Jan. 27 and 28, a school for the farm sales consultants. We are finding all of the employees enthused over the idea of revenue building and we believe that we should have a very successful year.—*Pat Johnson, vice-president.*

Paper and Oil Promise

Snohomish County PUD No. 1—The Snohomish County area is now well launched on a new cycle of economic expansion. The first phase of this cycle began last August when the Weyerhaeuser Timber Co. opened a

In Seattle the IES early last year ran a two-hour, eleven-week course on lighting for architects, engineers, optometrists, contractors and distributors, at Edison Technical School, with 137 registered. Teachers for the course were drawn from the industry

new Kraft pulp mill. In June of this year the Scott Paper Co. puts into operation the second of the new high-speed paper machines which become the first units of this important new industry. Before 1954 comes to an end this area is expected to feel the impact of northwest Washington's important new petroleum industry. Petroleum industry predictions say that the area will see the heaviest concentration of chemical and petro-chemical industries of any part of the nation.—*A. S. J. Steele, manager.*

No Rush Now for Heat

Tacoma City Light—Electric appliance sales in this area for 1953 were about on a par with those of 1952. However, it is expected that sales for 1954 will require a great deal more competitive selling. While the discount houses have not made much of an inroad here, several of the so-called "surplus" outlets have been acting in that capacity and have turned a considerable amount of merchandise.

We expect to continue encouraging the replacement of the old energy consuming side-arm water heater with electric automatic water heaters of 50 gal or larger capacity, as well as to continue our adequate wiring program with particular stress on replacing two-wire with three-wire services.

In July 1953 restrictions on use of energy for space heating were lifted. Although there seemed to be a large market for this service, we found that by mid-October there were only 156 complete installations made with a total of 792 individual heaters and a name-plate rating of 1,200 kw or an average per heater of 1,500 w. We have experienced an increased kilowatt-hour sales with only a minor increase in load. By the middle of 1954 we will be able to produce some further information regarding this matter. —*J. Frank Ward, superintendent, Light Division.*

All Employees on the Team

Washington Water Power — The major change is emphasis on actual selling, with our ultimate goal 10,000 kw per average residential customer. We desire to achieve with residential salesmen a sale of some appliance on every household call. Salesman will continue to solve a dozen or so routine company problems that have to do with public contact, such as high bill complaints, service locations, etc. We are inclined to look upon these routine matters as door openers and wish to utilize them constructively.

Also, we are trying to make a fuller use of our dealers in the area. There may be some changes regarding the dealer set-up. In addition, we are attempting a rather unusual procedure, which means that all employees will take part in load-building activities. I say this aspect is unusual, because there will be no rewards, no bonuses, nothing by way of material recognition except an all-employee party, perhaps, to the winning division in a competitive sales situation.

Our winter electric range campaign, which just terminated after three months and which was directed against two-wire service customers — that is, people who are using other types of fuel with which to cook, and yet who have electricity available in their homes—indicated that employees, if made to feel that they are working for their own security and company expansion, will build load without special compensation. For, with a 79% saturation of electric ranges, employees and sales people together reached a quota of 1,000 ranges and 600 water heaters by an excellent margin. The company does not plan to actually sell merchandise but will work through the dealers.—*K. I. Jack, general sales manager.*

Wyoming

Railroads and Cattle Decide

Cheyenne Light, Fuel & Power—The company serves only the city of Cheyenne and its immediate fringe and the economy of Cheyenne is predicated upon the livestock and railroad industries.

The Union Pacific Railroad Co. expects to change from steam locomotion to diesel, but the effect of this change will not be felt to any great extent this year. Cheyenne being the capital city of Wyoming we have state, federal and city pay rolls, which will remain pretty much the same. The oil refining business is expected to continue on about the same basis as 1953 and our aircraft business is expected to increase somewhat over 1953. Hence, we feel that the business conditions in Cheyenne will be very little changed from our experience in 1953.—*W. B. Petch, commercial manager.*

Hawaii

Cooperative Selling Drives

Hawaiian Electric Co. — Although no report from this company had come in by press time a brief comment on the 1953 activities of the Electrical Living Committee of Pacific Coast Electrical Assn., Hawaii Section, is deserved.

Business conditions in Honolulu and the Island of Oahu were good in 1953. A decline because of the reduction in forces based on the island by the Army, Navy, Marine Corps and Air Force is being felt around the military

Kilowatt Karnival was conducted in Hawaiian Electric Co. auditorium by its home economics girls to demonstrate to customers the dainties possible with table appliances

At Victoria Home Appliance Show Electric Service League let folks "play overload." The show sold $65,000 worth of appliances for dealers over the four-day exhibition

posts. However the tourist influx is increasing as more airlines feature trips to Hawaii. The sugar and pineapple crops and industries surrounding them seem to be stable unless labor demands cause strikes or raise operating costs too high. However, serious effort is being made by business men in the islands to develop by-products from the sugar and pineapple crops and to further develop other tropical fruit markets, such as papaya and frozen guava juice, on the mainland. The local garment industry, featuring Hawaiian patterns and informal leisure clothing, is growing.

In the appliance field the Electrical Living Committee has on its schedule for 1954 campaigns on laundry equipment in January and February, electric range and water heater in March and April, dishwasher, disposer and calcinator in May and June, room air conditioners in July and August, food freezers in September and October and electric housewares and television in November and December. Committees of dealers, distributors and the power company run these campaigns, supported by Hawaiian Electric advertising, by an exceptionally capable home economics department, by sharing the cost of wiring for heavy-duty equipment such as ranges, water heaters and dryers. Campaigns in 1953 resulted in the sale of 135 dryers, 1,348 ranges, 1,267 water heaters, 922 freezers. It was estimated by a local radio-TV station that 40,000 TV sets were in use by Jan. 1, and that the number will double by the end of this year.

Strikes Could Cripple

Maui Electric — Our promotional plans are incomplete for the coming year and we hesitate to express a view on the business outlook. We serve an isolated area, with a population of some 33,000, whose economy depends on the success of the sugar and pineapple industries. These industries are vulnerable to strikes by their workers and the stevedores, all of which are controlled by the ILWU, under Bridges. Negotiations are in process in both industries and a strike is definitely threatened in the sugar industry, which would play havoc with the local economy.—*O. C. Murdoch, assistant treasurer.*

Canada

Oil and Gas Bring Industries

B. C. Electric, Vancouver—We will continue active load-building promotions in our residential, commercial and industrial fields. New home building is expected to be very active in 1954, as there has been some liberalization by the government of the down payment and monthly payments required, particularly affecting those homes valued at $10,000 or less.

The supply of appliances throughout the year will be more than ample unless a more realistic approach to selling is taken by some of the distributors and dealers. The opening of our first local television station on Dec. 16, 1953, will result in an increased market for television sets throughout the year.

Industrial development continues in British Columbia on a large scale. The completion of an oil pipe line from Edmonton to the Pacific Northwest last October has resulted in several new oil refineries and several large additions to present ones being placed under construction around Vancouver and in the area immediately south of the International Border.

There is an indication that our secondary industries will continue to keep pace with our increasing population and expanding markets. It is hoped that early this year a favorable decision will be handed down by the Federal Power Commission so that natural gas will be made available to the Pacific Northwest. Considerable industrial activity will follow the bringing in of this new fuel.

We are looking forward to an extremely busy year in all sections of our general sales division.—*J. H. Taylor, residential sales manager.*

TV and Shows Boom Trade

B. C. Electric, Victoria — Promotional programs for 1954 include active campaigns in the commercial-industrial lighting field as well as in home lighting. On the agricultural side, irrigation and farm freezers will be promoted. Increased training classes, cooking schools and dealer demonstrations are forecast. Residential new building program is expected to level off but to slightly surpass 1953.

The third annual Home Appliance Show will be sponsored in September at the urgent demand of distributors and dealers. The Victoria Show is on the distributor-manufacturer level but with all booths staffed by local dealers.

General business outlook is optimistic but tempered with a realism that certain industries such as lumber manufacturing, because of restricted export markets, may cut back some.

Increases of sales of clothes dryers and dishwashers are anticipated. 1954 will undoubtedly be the biggest year ever for television. In the Victoria territory, one Canadian and five American stations are being received quite satisfactorily and, with a possibility of two more stations being added this year, the consumer is in the position of being offered a terrific variety of entertainment.

For the over-all picture, it is anticipated that this territory's sales of electrical appliances will likely exceed 1953 by a very small percentage.—*A. W. J. Smith, sales manager.*

A "believe it or not" on Philco's new refrigerators is a door, hinged on both sides and so devised that it can be opened from either left or right. Miss San Francisco demonstrated it at Dallman Co. Philco showing. With her are Malcolm Jacobs and Guy Plank, appliance sales and division managers. Among other refrigerator makes General Electric has revolving shelves, both Admiral and Coolerator transpose freezer to the bottom

An idea of the screen size of the first color television sets is gained from this Admiral set, which has an additional feature that its top can be lifted up to expose the chassis for sensitive picture tube adjustment. With three colors to excite from three electron guns a potential of 20,000 v is built up in this color set. Estimates of service policies to keep color receivers adjusted begin at about $200 per year

Some New Wrinkles

Among 1954 Appliances

Sunbeam has brought forth the first electric frying pan with automatic heat control which can be immersed in water for washing up to the thermostat switch in the handle. The most used utensil is now all electric

Jim McKenna shows seven ways to cook on the top Frigidaire range whose cooker serves to deep fry, pop corn, an extra oven or surface unit with temperature control on for deep frying; oven can be divided

International Harvester made its decorator idea easier to apply to its refrigerators and also the top of its freezer by redesigning the doors. Kitchen woodwork can be imitated on refrigerator door, or drapes used. San Francisco meeting brought together brothers A. S. Knudsen, assistant manager, factory domestic sales, left, and H. C. Knudsen, I-H district manager, Oakland, right. Bruce Wilson, Thompson-Diggs, distributor, is in between

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

On the boards

Engineers and architects say they have a lot of work on their boards to be let later in the year so the present slow construction time is not serious. It is seasonal. The difference is that the hurry is gone and that means less overtime and premiums for speedy completion. It also has more electrical workers on the bench in all the locals in the West. Bidding is unhappily competitive, even the little jobs swarming with bidders and prices are cut to bleeding.

To ask for more

Demands for more wages and fringes, despite the warnings of the times, are brewing again. In Seattle, Local 46 is said to be girding to ask for 50c an hour raise plus 6c for vacations. It got health and welfare last year. In Los Angeles the union has thrown the book at NECA, which got by last year with a 10c raise "in lieu of" welfare. Now the union wants $3.50 an hour, 4% vacation, 7½c health and welfare, seven paid holidays, one hour tool pickup time, an extra hour's pay when working downtown (Oh that traffic!), two hours off for voting, revised travel expenses, and the stewards handle the men's pay, etc. Other locals are thinking up what to drive for. Alaska unions may ask for $4.50 an hour plus.

Golden honor

Motor shop old-timers, Frank E. Boyd, Pacific Electric Motor Co., Oakland, Fred W. Buzzell, Buzzell Electric Works, Martin Flatland, Globe Electric Works, both in San Francisco, and John W. Van Alstyne, Sacramento, will be presented 50-year awards by the Northern California Chapter, National Industrial Service Assn., at a dinner, Feb. 25 in San Francisco. William Hogue, NISA president, will come from Los Angeles to make the awards.

Business prospect

Another million homes will be built in 1954, which is about what were built in 1953, Louis J. Murphy, Bank of America assistant vp, told 150 wholesalers and their salesmen called together by the Northern California Electrical Bureau, Jan. 26, in San Francisco. They may be lower priced homes, which may mean less wiring, however. With 7% of the nation's population, 15% of the new homes were built in California last year. Other Western states had similar percentages. He also said incomes were higher, industry still coming, population increasing, jobs plentiful in the West. He urged action in the home modernization field under FHA Title 1 loans, saying roofing, painting and other industries have ben doing well in this field; electrical hasn't tried.

In the bid bind

When wholesalers take off material estimates on jobs and bid them to contractors, A. H. "Bill" Gudie, Biddle Trade Bureau president, told the same meeting, they get caught in the evils of bid peddling. "It is one thing to help a contractor perform his functions and quite another to do it for him," he said. Gudie dealt frankly with many of the selling evils, such as price cutting, afflicting the industry. We hope to publish his straight-talk message in an early issue.

Golden honor

City Electric & Appliance Co., Boulder, Colo., celebrated its 50th anniversary with a grand opening of its remodeled building and a new and larger warehouse and shop three blocks away, Jan. 29-30. It can now house and dispatch its 28 trucks to much better advantage. Story soon.

Learn by doing

An architectural lighting design competition among senior and graduate students of the University of California College of Architecture will be conducted by Northern California Section of Illuminating Engineering Society, with prizes, certificates and student membership awards. Lloyd Gartner, San Francisco architect, is chairman of the committee. Southern California Section has conducted a similar contest for the past two years.

Finally starts

Health and welfare benefits for electrical workers in the San Francisco Bay Area start Feb. 1 under a California Physicians Service plan that committees from NECA and IBEW selected after working since last July on the details of setting up such a plan, agreed to in negotiations.

Time to act

Congress, with the new administration's program before it, has not taken steps as yet to bring the Federal Construction Contract Bills, S-848 and HR-1825, to the floor yet. Intensified effort on the part of electrical contractors in contacting their representatives in Congress is urged by all NECA chapters. The electrical distributors who likewise suffer from the results of bid peddling and shopping have been alerted also. The California Builders Exchange voted endorsement of these bills at a recent Yosemite meeting.

Is ceiling electric?

A jurisdictional fight is brewing over who installs luminous ceilings, the electrical worker or carpenter. Architects, to save their clients money, have been specifying the luminous panels as part of the general construction, leaving only the fluorescent strips for the electrical contract. Electrical contractors have been slow to catch on and try to sell this kind of lighting and it is getting away from them. It will take more than mere union pressure to bring it to them. They need to jump into selling and learn to install these ceilings.

Changes

Names in the news: Al R. Parker, manager of lighting at General Electric Supply in San Francisco, has joined Bakeman & Associates as manufacturers' representative. His work at G-E Supply has been taken over by Robert B. Scholes, who has served in the lighting department in Oakland and San Francisco . . . Albert L. McGuire has been named manager of G-E lamp promotion for American Factors, the G-E agents in Honolulu. He came from Nela Park . . . Ets-Hokin & Galvan, industrial and marine electrician, has appointed Ralph Askin, formerly Oakland manager, as vice-president in charge of outside work and Frank Gadsby becomes Oakland branch manager . . . Globe Electric Works, one of San Francisco's pioneer industrial electrical firms, sold its building at 15th and Mission and moved to new quarters at 68 Julian Ave. not far away, according to Lloyd Flatland, manager.

NECA elections

Little change in officers in the annual elections of officers for several NECA chapters. Sacramento Valley Chapter advanced Paul Benge from vice-piresident to president, succeeding William Cotter, who becomes governor and director. John Decker is new vice-president, A. J. Naylor Jr., George Foss Co., secretary and E. L. Bryant, Collins Electric, is treasurer. William Welsh is manager . . . San Joaquin County Chapter at Stockton re-elected J. E. McCarty, president, Glen Bockmon, vice-president, Paul Curtis, secretary-treasurer. Ed Grogan is manager . . . San Francisco Electrical Contractors Assn. re-elected its officers with only one shift. Emil J. Weber is president, Earl Peak Jr. is vice-president, succeeding Rod Newman, who remains a director; Ed Scott is secretary and Roy Moser treasurer. Emil Weber was also elected president of the California Conference of NECA Chapters at its Jan. 23 meeting in San Francisco and W. J. Varley, SF manager, named secretary. Alexander Berg of Los Angeles was elected vice-president. The bylaws will be amended to admit the new Nevada Chapter and change the name to California-Nevada Conference.

Westerners named

National Contractors Assn., an organization composed of big engineering and construction firms doing power plants and industrials, elected John F. O'Connell, vice-president of Bechtel Corp. of San Francisco, as president; L. C. Reynolds of C. F. Braun & Co., Alhambra, on the executive committee and H. B. Christman of Fluor Corp., Los Angeles, chairman of the foreign committee, at its recent annual meeting.

Contest is on

"My Most Interesting Lighting Job" contests have been started in several of the Illuminating Engineering Society chapters and sections, to be judged in March meetings so that the regional winners may be selected at the regional conferences in April, in Denver, April 12-13; San Francisco April 19-20; Seattle April 23-24.

Agency

Conrad Electric Co., at 2520 San Pablo Ave., Oakland, one of the oldest contracting and motor shops in the nation, founded by R. H. Conrad, has just been appointed an industrial agent for Westinghouse Electric Corp. motors and control in Alameda and Contra Costa Counties, William S. Bassett, general manager of Conrad Electric, announced.

Energizer

Edward L. Ralston Jr., commercial engineer for Hawaiian Electric Co. and long active in the Hawaii Chapter, International Association of Electrical Inspectors, was elected its chairman, Jan. 15.

Want test laboratory

In Canada instead of an independent agency like Underwriters' Laboratories a governmental agency, the Canadian Standards Assn., makes the tests and issues the labels on electrical equipment and materials. It was suggested recently by Provincial Inspector Robson at a B. C. Electrical Inspectors association meeting that a labeling and testing system be set up in British Columbia for Western-made equipment and to pass upon devices and equipment brought in from the U. S. West Coast. He suggested that the B. C. Research Council run the tests, saying that the Alberta Research Department already does so.

Condensed light

Another lamp wattage increase or shift to smaller bulb is announced both by General Electric and Westinghouse lamp divisions. The new 200-w lamp will come in what used to be the 150-w bulb size, the 150 w now coming in the former 100 w. Higher temperature is possible, it is claimed, because of a heat-reflecting disk in the base to reduce socket temperature. There will be no increase in price.

Biggest unit

A luminaire for 1,000-w mercury lamps for wide boulevards, shopping areas, etc., has been announced by Westinghouse Electric Corp. This OV-60 unit will take either 700- or 1,000-w mercury or mercury fluorescent, and is designed to be mounted at a tilt of 15° to distribute across 125-ft boulevards.

More output

Sylvania showed new fluorescent lamps which it claims produce 6% more light (57 to 59 lumens per watt after 3,000 hours burning) because of new "stabilized" phosphors, at the recent Chicago plant maintenance show. It also featured the 1,550-w infrared heat lamp and luminous panel or panelescent lamp.

Price drop

Leadlight Fixture Co. of Oakland announced substantial price decreases for its line of fluorescent fixtures. Reductions were made possible, it says, because of localizing freight factors and engineering improvements to its plant.

Glass gin

A hot line gin to hoist transformers, etc., on power poles and towers, using glass fiber instead of wood, is announced by Petersen Engineering Co. of Santa Clara. The new gin weighs only 25 instead of 52 lb, is stronger, having a shop-tested 4,500 lb capacity, according to Petersen. It will cost about $145 but should last many times as long.

Equalizes heat

A cement slab brooder for baby chicks, cast with electric heating cable in the slab and thermostatic control, is declared to be a highly satisfactory brooder by an Orange, Calif., farmer. Mortality rate among chicks has been reduced from 8 to 2½%, the slabs keep dry and keep temperature more constant over the entire surface.

Strong yank

A power wire and cable puller, portable, weighing only 65 lb, attaching to the conduit and not the box in vertical, horizontal or angle positions is announced by Barth Corp. and is sold by G-E Supply, Graybar and Westinghouse Supply. It has 175 ft of tape, will push it around five 90° bends at 25 ft a minute or pull 15 ft of wire per minute into ¾- to 2-in. conduit. It operates on 115 v a-c or d-c.

All in one box

A new 16-circuit split-bus load center that should eliminate the need for a separate main disconnect while yet providing for range, water heater and dryer, using a fourth pair of breakers as main for eight lighting or appliance circuits, is announced by Trumbull components department of G-E. This makes possible use of this single center while complying with the NECode requirements about subdivisions of load.

Adjunct

Fittings for the new liquid-tight flexible conduit such as Sealtite have been brought out by Appleton Electric Co. in its ST series. The fittings use neoprene gaskets in the assembly, are quickly installed and come in four styles that fit all needs.

Ring the bell

Edwards Co. offers electrical contractor-dealers a new bell, buzzer, transformer and contact device display board, 20x18 in. in size, for counter use and demonstration.

Answers

Burndy has a new and comprehensive catalog of connectors for aluminum bus and cable, which gives answers to flow, corrosion and other problems.

Better protection

Economy Fuse Co. announced a new line of dual-element fuses with a new alloy thermal element that will take temporary motor overloads up to 500% but will blow fast on short circuits. These fuses, made in ferrule and knife-blade types in all ratings up to 600 amp, also protect against single phasing, George Bryant, San Francisco factory representative, announced on his return from a recent meeting of the Economy sales force in Chicago.

Seattle officers

Puget Sound Chapter of NECA elected Van S. McKenny its president to succeed Charles Meagher of Mars Electric, who remains treasurer of the chapter. He served as both president and treasurer last year. C. D. Casey succeeded B. H. Beckstrom as vice-president; John Sroufe was named governor to succeed Don W. Close. John B. Majerus is secretary-manager and L. L. Goddard his assistant in charge of public relations.

Another branch

Fischback & Moore has opened a branch in Seattle at 3201 Fremont Ave., with S. E. Davison as district manager. The New York electrical contracting firm has branches in Los Angeles and San Francisco.

Ambitious program

Another "Qualified Contractor" program of tremendous scale is envisioned by the Refrigeration and Air Conditioning Assn., with a promotion, sales training and mechanics training program based on an expenditure each year of $270,000 from manufacturers, union and contractors, or $1,500 per month per million people. The association is making moves to service the growing air conditioning both of automobiles and homes and offices.

Package deal

A package plan to sell all the wiring devices needed for a home in one convenient package has been developed by the Arrow-Hart & Hegeman Electric Co. to go along with an idea promoted in its attractive rotogravure 40-page book, "Easier Living Within Your Power Electrically." Four packages may be selected from, each containing devices for a different size of home. An "A" package is recommended in each case. It is for the adequately wired home. The "B" package is for the minimum. A folder or work sheet to go with the above booklet (cost 10c) is offered contractors to aid in checking off the requirements of a house.

Estimators alerted

Huge new California State Department of Personnel building soon to go to bids will employ 480-v distribution and 277-v lighting with low-voltage relay switch control and have steel duct floor to facilitate serving the many office machines. It will be two buildings, one six-, one seven-stories high, bridging over 8th St. in Sacramento between 7th and 9th on Capitol Ave., totaling more than 500,000 sq ft. It is expected to be highly competitive; due to be finished in 1956.

University credit

Two university extension courses, one on lighting design and one on thermal and luminous radiation, are announced by the University of California at Berkeley and Los Angeles Monday and Thursday evenings, beginning Feb. 15 and 18. The Berkeley lighting course will be taught by Prof. Dan Finch; the Los Angeles one by Philip F. O'Brien. The thermal radiation course will be taught in Los Angeles by Robert Bromberg.

Change hats

An increase in electrical contractors licenses has been noted of recent months in the California State Contractors Board. By coincidence the number of licenses in some cities nearly equals the number of electrical wiremen. Could it be that in case of unemployment at today's high wage rates these "contractors" will go after business on their own at whatever wages they find the public will pay, leaving off the health, welfare, pension and other fringes, taking business away from contractors bound by contract to pay these extras?

Enacted

Vancouver, B. C.'s new electrical bylaw becomes effective Feb. 15.

Hunger for wiring

Surprisingly big returns are coming in every week from the television spots that the Northern California Electrical Bureau is sponsoring on behalf of contractors, union, suppliers, manufacturers and utility. Since the spots were switched to an afternoon home interest show, cards and letters numbering about 300 a week have been flooding NCEB. It sends them a condensed mailing piece then turns the cards over to the participating contractors associations to follow up. The committee voted to run the 13-week series over again. It shows a real market exists.

ELECTRICAL WEST Sales Guide

News Letter

February 1954

©

FOR THE ELECTRICAL MERCHANT OF THE WEST

Things look firmer as the year advances. A mild winter, an administration intent on normalizing instead of creating crises, manufacturers settling down to policies of fewer dealers, distributor shuffling quiet for the moment, prices firming, inventories in fairly good shape at all levels--these begin to look like a more stable situation. But it still will be highly competitive. Discounting and price cutting have not made volume, so buckling down to selling becomes necessary, distasteful as that may appear. As Charlie Culbert of Sues, Young & Brown put it, 1954 is the year to "merchandise or drop dead" for dealers.

Settling down

Could it be that the shuffling of distributorships and consequent upset of dealer brand representation is making brand and manufacturer reputation less important? A Business Week report on a Burke Marketing Research study of some 8,000 purchasers shows that maker's brand and reputation counted 4th, 5th and even as low as 8th in reasons for buying what they did. Price was second in all considerations, first on TV. Only ranges had manufacturer's reputation as of first importance.

What public thinks

Some pretty revolutionary ideas in kitchen appliances and methods can be previewed in Los Angeles March 6-14 and San Francisco March 27-April 4 when General Motors Motorama will be seen. Frigidaire really dreamed up a kitchen of the future for its New York showing. Its cabinets, ovens and three types of refrigeration move up or down to waist height when wanted. An electronic oven is included. It's a dream come true.

See a dream

The Chicago market was better attended than previous ones and though buying was cautious it was said to be substantial. Interest was keen in new things. G-E showed a further development of its idea last year, a wall-mounted, above the counter, refrigerator made possible by its new vacuum insulation. Gibson took the freezer completely out of its refrigerator, urges the sale of a matching upright freezer with it. Quicfrez twins has the same idea, for undercounter placing. All makes had some new gimmick. Shorter lines were also the fashion.

Gadget loaded

San Diego is to have a furniture mart. Nelson R. Thomas has disbanded Thomas Distributing Co., giving up Coolerator, Apex and Hallicrafter lines, to start a mart at 1002 W. Juniper St. where 40 furniture and four appliance lines can be displayed.

A new mart

Crosley has been capitalizing on the Bendix washer acceptance among dealers to get many to handle the Crosley line who did not do so before. Its refrigerator door handle dispenser of cold drinks helps.

Advantage taken

Inland Empire Electrical League, Spokane, elected Henry Vincent, Westinghouse Electric Supply manager, as president succeeding Maage LaCounte, Columbia Electric. Joe Thomas, Densow's, is vice-president; V. E. McCain, Graybar, treasurer; Frank Tool, WWP, secretary. The Washington Water Power "Leadership" campaign through the IEEL aimed at two-wire customers in 1953 ended with 1,062 ranges against a 1,000 quota, 753 water heaters against a 600 quota. It was the first sales program in 10 years. A "Winter Sunshine" campaign, offering two dryers as prizes each week for 7 weeks for guessing sunshine, began Feb. 1.

Sunshine for dryers

A streamlined Western Radio & TV Appliance trade dinner, during Market Week in San Francisco Merchandise Mart, Feb. 10, was scheduled with LeRoy H. Bennett, Northern California Electrical Bureau, as chairman; Joseph B. Elliott, executive v-p, RCA, to talk on color TV; and dynamic Bob Bale to put the kicker on the meeting, which entertainment often failed to do.

Pepped up a lot

Sacramento Valley Electric League will sponsor another electric range contest beginning March. The "I Want an Electric Range" contest last year was declared by C. N. Coppin, president, highly successful . . . Intermountain Electrical Assn. is readying its program for its annual conference at the Newhouse Hotel, Salt Lake City, March 9. Nationally prominent speakers are being contacted. . . Electric League of Los Angeles holds its annual banquet meeting at the Hollywood Roosevelt Feb. 18 with Paul Zimmerman, sports editor, Los Angeles Times, as featured speaker.

Programs ahead

"Let's Look at Color Television" will be a demonstration on a closed circuit with a color generator at the annual winter conference of San Diego's Bureau of Home Appliances Feb. 24 in Balboa Park. Headline speakers are Robert Galvin, executive v-p of Motorola, Chicago, and Frigidaire's W. I. Buchanan, San Francisco. The TV demonstration will be put on by Dick Silberman and John Day of Kay Laboratories, Los Angeles. A panel of industry executives to answer questions about today's marketing difficulties will be on hand. . . Sign up for space in the bureau's 10th annual spring fair of Modern Home Ideas April 23-28 is beginning and promises to sell out the three big buildings in Balboa Park. A contractor's building will be featured again.

Color and sound

Air conditioning, refrigerative and evaporative, will start being promoted by the Appliance Merchandisers Assn. in Phoenix on Feb. 28 to March 27. Orville Johnston and Al Maggs are chairmen of this promotional group. Next comes the annual appliance show April 8-11 at the State Fair Grounds with Bill McKay and Millard Smith as chairmen. Henry B. Sargent, president, Arizona PS, told the annual banquet attendance "1954 is a year of challenge." He pointed out the need to train salesmen, improve cost and operating efficiency, put long-range investment in equipment and facilities, and financial soundness. Kenneth R. Johnson, general sales manager, Packard-Bell, Los Angeles, spoke also. George Cornforth succeeded James P. Donahue as president.

First into summer

Distribution changes: So far there seems to be no likelihood that the merger of Nash and Hudson will affect the Nash-Kelvinator ownership or distribution. . . In Canada, Gibson Refrigerator Co. made a deal with General Steel Wares Ltd. to manufacture its line, which will give it distribution through 16 branches of Canadian Fairbanks Morse Co. . . Fidelity Electric was formed in Seattle to distribute RCA Victor in Western and Central Washington and in Alaska. Harper-Meggee Inc. last month dropped this line. C. P. Paschall is president, J. E. Gollihur executive v-p and treasurer, and John E. Ryan secretary. Gollihur was

Still changing lines

with Harper-Meggee. . . Motorola took on Salyer Distributing Co. in Albuquerque and stays with Boyd Distributing Co. of Texas in El Paso. Both Salyer and Harbaugh of El Paso were formerly with Boyd Distributing Co. of Denver, now no relation. . . Ironrite appointed Electrical Equipment Co. of Arizona in Phoenix to replace United Western Distributors. . . Yes, Admiral established a factory branch in Denver, headed by William Hand, general manager, Arthur Kitto, appliance supervisor. . . Perfection Stove Co. named D. N. Latus & Co. distributor in Montana and 11 counties in northern Wyoming. Latus Bros. handle Capehart, Amana, Toastmaster and ABC, located at 1531 National Ave., Helena. . . Horn & Cox Inc. is now the Raytheon TV distributor for seven southern California counties. James Kerwin Distributing Co. had it prior. . . Apex laundry equipment, given up when Thomas Distributing Co. opens up a furniture mart, goes to Zastro-Goetten Co. for San Diego and Imperial Counties. . . Mid-Cal Distributors is a new firm in Fresno with George S. Ballas, V. E. Lehman, Steve G. Ballas and B. N. Ritchie as partners. . . Mitchell Mfg. changed distributors in Phoenix to Lentz Enterprises, replacing Arizona Wholesale; and McCormack & Co., San Francisco, replacing California Refrigeration; Graybar in Fresno and Clarke-Wheeler in Sacramento. . . Crosley, recently distributed by factory branches in Portland and Seattle, now goes back to independent distributors. In Seattle Carter, McIlroy-Johnson Inc., from a new building at 4747 25th Ave., N.E., distributes Crosley and Bendix. In Portland Robert L. Rice Co., formerly handling Emerson, Thor, L & H, takes on the Crosley and Bendix with Vincent Cooney as s-m for these appliances and Ralph Sachs for the radio and TV. Rice Co. moves to the Crosley branch at 2900 N. W. 29th Ave. L & H has been taken over by Don Ryan, Rybar Co. C. J. Ward, former branch manager for Crosley, moved to New York. . . Tropic-aire and Manning-Bowman housewares are now handled in western Washington and Alaska by Washington Distributors, Seattle. . . Archie Marsden returns to San Diego to represent Stanthony hoods, Conlon laundry equipment, at 820 W. Ash St. . . Century Distributing now handles the Blackstone line in San Diego.

... and more

Among people many changes, promotions, etc.: Roy N. Vernstrom becomes general sales manager of Pacific Power & Light Co. as it reactivates sales and customer contact work. He was assistant g-m, formerly advertising manager. . . William L. Tait, formerly Harper-Meggee Inc., and Crosley-Bendix, joined Portland General Electric Co. as appliance sales representative. . . Larry Greer, Sacramento commercial manager, PG and E, comes to San Francisco as sales manager, succeeding Harry Lee, now division manager. Gordon Beachy from San Francisco goes to Sacramento as commercial manager and Carl P. McCarthy takes his place.

Promotions

Westerners who went East: Harold D. Conklin, who was v-p and g-m of Admiral Distributors in San Francisco, was promoted to general sales manager of Admiral Corp. to succeed Paul Dye. Paul J. Dorsey succeeds Conklin. . . Stanley J. Stephenson, native of Salt Lake City and with Wesco in Seattle in 1941, has been made manager of household refrigeration for Westinghouse Appliance Division. . . Preston Cherry, assistant Western regional sales manager for Amana in Seattle, before that with Kaemper & Barrett and H. R. Basford Co. of San Francisco, is now eastern regional sales manager for Amana. . . M. J. "Mike" Nicolin, who headed Admiral's distributorship in San Diego, has been moved to the Houston, Tex., division. Carl Lantz succeeds him.

Went East

More names: G-E Supply promoted Eugene F. Graff to traffic appliance sales manager; W. H. Struckman sales manager of radio, TV and traffic appliances; and Richard La Pado advertising and sales promotion manager of major appliances in its San Francisco district.

And this isn't all

"Color is to black and white what black and white was to radio," Les Hoffman told a San Francisco NARDA meeting Feb. 2. It will be a supplementary, not a replacement, service just as TV was to radio. He also said manufacturers have trimmed production to sales and inventories are now balanced. With sales in a $180 to $350 bracket now instead of higher, more units will have to be sold to make the same income. He urged starting to sell more near the middle or top rather than the bottom. With extras, such as Buck Rogers headsets for kids to hear the sound, Hoffman will give something with which to sell up.

Expert opinion

Other TV spots: Several gadgets to cut off the sound during commercials are selling in big quantities. Will this affect advertising support of TV programs? . . . Color sets become obsolete even before they reach the market. Now RCA announces 19-in. instead of 15-in. tubes and DuMont predicts a 21-in. set by summer. . . Every once in a while the NBC-TV stations in Los Angeles and San Francisco slip in a color program to test equipment. Few are equipped yet to see them. It's all b&w to them. . . Another color patent has been granted Jacob H. Wiens, Redwood City, for a tube with lateral color lines. . . Several makes had color sets on demonstration at the Chicago Market. San Francisco Market may have a showing Feb. 9 in the Green Room. . . Estimates of color service contracts run between $175 to $300 per year, as contrasted to b&w contracts of from $60 to $80.

Variety show

While $199.95 remains the bottom for many sets, Admiral announced a 21-in. at $189, then $179, and Columbia a 17 at $159. Westinghouse dropped its 17-in. from $179 to $159 too. High-fidelity phonographs likewise are featured now by many TV makers. Packard-Bell has even entered the home air conditioning and evaporative cooler field. Columbia ties in a mobile home TV set in the Pacemaker trailer coach.

More acts

Another oddity in addition to silent sound is DuMont's Duoscopic or two-headed TV receiver on which a man and wife can each be looking at a different program at the same time.

Janus

Carl Hagstrom, General Appliance Co., San Francisco, was elected a vice-president of NARDA at its annual election in Chicago in January. J. R. Westwood of Billings, Mont., Keith Davis, Seattle, and Phil Urner of Bakersfield are on the directorate. Hagstrom sold the idea of having regional conferences in the summer instead of the usual June meeting in Chicago. Conferences will be held in San Francisco, Seattle and Billings.

Western spokesmen

More names: O. B. Wilt Co. appointed Fred L. Barber to its staff, San Francisco Merchandise Mart. . . Deepfreeze named Alexander Fletcher, Portland zone, and Jack O'Brien, San Francisco zone, manager. . . Leonard J. Neary is Western sales manager of Rival Mfg. Co. at 3120 W. 9th St., Los Angeles. . . J. H. Orpen is now district manager, northern California area, for the home cleaning division of Landers, Frary & Clark.

Appointments

FCC is studying what UHF stations are able to survive in markets with VHF. . . FCC also withdrew permit from an El Paso channel 13 station that asked to be relieved. . . Los Angeles's first educational TV station, KTHE, went on the air in December. FCC granted a permit to KUOH University of Hawaii. . . FCC is also checking into CBS holdings under the limitation of six standard broadcasting stations. CBS has minority holdings in several more. . . G-E and CBS have teamed up to manufacture a new television camera adapting CBS color wheel to a b&w camera for colorcasts at far less cost. . . In Wyoming the tax collectors moved in to collect sales tax from TV closed circuit service.

Among stations

Quick Catch Up

Dealers

Antitrust and unfair practices acts that affect retail appliance dealers were dealt with frankly by Clarence A. Linn, assistant attorney-general for the State of California, in addressing the **Santa Clara Gas & Electric Appliance Assn.** Jan. 12 in San Jose. Linn explained the three major acts in California affecting retail business, namely, the Fair Trade Contract Act, under which resale prices are set by the manufacturer; the Cartright or Antitrust Act, forbidding agreements between persons in restrictions of trade; and the Unfair Trade Practices Act, which is aimed at loss leaders and sales below cost. There are similar acts in other Western states.

Under the Fair Trade Act, the manufacturer polices the enforcement of it and the state takes no part except to offer the courts for suits against private individuals or companies violating the act. Under the Antitrust Act, fixing of prices or raising of prices by agreement, or agreement to use a price book, is illegal. Prosecution is made only upon charges by the public or other dealers. Of the Unfair Trade Practices Act, Linn said colorfully, "It sounds like ragtime and it works like ragtime most of the time." The difficulty is in setting what is cost and establishing the intention of the parties as being to "foster monopoly or destroy competition." In the absence of any cost figures, a 6% overhead is assumed. Here again, he said, the act is not self-enforcing, and charges must be brought in court either by a trade association or by individuals. The attorney-general's office is not sleuthing for violations.

Election of officers was held at this meeting. Al Smith was elected president to succeed Leo Allampress as Joe Martino, the vice-president, declared he was not available. Harold Buttel was elected vice-president and G. L. Russell, PG and E, re-elected secretary-treasurer.

Salinas Valley Gas & Electric Appliance Dealers Assn. recently elected Earl Albertson of Majestic Furniture as president; Ernie Gnesa, Soledad Plumbing & Electric, first vice-president; Arthur Kersch, Kersch's Furniture, second vice-president; and Ellis B. Langley, PG and E, secretary-treasurer.

Fourth annual Tri-County dealers meeting of the Salinas Valley Gas & Electric Appliances Dealers Assn., the Monterey Peninsula Gas & Electric Appliance Dealers Assn. and the Santa Cruz-Watsonville Gas & Electric Appliance Assn. was held at Loma Linda, Watersonville, Jan. 26. O. R. Doerr, vice-president in charge of sales, PG and E, spoke on "What's the Score in '54?" and the "All" show, a "No Soap Opera," was presented.

Monterey Peninsula Gas & Electric Appliance Dealers Assn. elected Les Hicks of Hicks & Howell as its president; Walter Brooks, Walter Brooks & Son, vice-president; and Ellis Langley, PG and E, secretary-treasurer for the 1954 season.

Representing outposts of NECA in the far north at last regional meeting were J. R. Young, contractor, Edmonton, Alberta, and R. W. Marsden, manager, Alaska Chapter

NECA

San Francisco Electrical Contractors Assn. Inc. has just bought a building at 1139 Mission St., San Francisco, to convert it into new headquarters. The main floor of 1,200 sq ft is to be rented to manufacturers' agents, wholesalers, etc. The second floor will be used for the offices and meeting rooms of the association, according to Executive Manager W. J. Varley. Parking space at the rear of the building is one of the advantages of the new quarters. For the past few years the headquarters have been in the Western Merchandise Mart.

NARDA

Carl Hagstrom, General Appliance Co. of San Francisco, was elected vice-president of the National Appliance & Radio-TV Dealers Assn. at its annual convention in Chicago Jan. 10-12. Returning from the convention, Hagstrom reported a surprisingly large attendance, averaging 500 at meetings and 730 at a banquet. The fine attendance, the dealers paying their own way, attests the vital interest of members in the national organization, he said. Meetings began at 7:30 in the morning and often continued through to 10:30 at night, holding 85 to 90% attendance throughout. No pessimism was anywhere apparent, he said, and the entire program was constructive and he felt would result in much sounder trade relations in the appliance industry.

Instead of the usual June national meeting, Hagstrom sold the idea to the new board of having a series of regional meetings. There will be one in San Francisco in September, followed by another in Seattle and a third in Billings. The entire staff and directors of NARDA will come West for these meetings. From his observations Hagstrom noted a trend among manufacturers for fewer lines, better franchising, elimination of unfair practices and a tightening of the situation to let dealers make a profit.

IEA

Intermountain Electrical Assn. started a course on Feb. 8 at the Board of Education Bldg. in Salt Lake City on "The Science of Closing Sales by Overcoming Sales Resistance" taught by Earle F. Gardemann. A price of $5 was charged for the set of six lessons, which followed a course prepared by Charles B. Roth & Associates.

Preparations are being made by a committee headed by George Earl of Utah Power & Light Co. for the annual sales conference of the IEA to be held at Hotel Newhouse March 9, according to James Schricker, managing director.

IAEL

Managers of the electrical leagues in the West were to take advantage of Market Week in San Francisco and hold a meeting Feb. 11 at the Northern California Electrical Bureau offices under Glen L. Logan, manager, Electric League of Los Angeles and chairman of Division 4 of International Association of Electrical Leagues. Managers of these leagues were expected to attend: William H. Johnson Jr., Appliance Merchandisers Assn., Phoenix; V. W. Hartley, PCEA, Los Angeles; G. L. Cane, Sacramento Valley Electrical League; J. Clark Chamberlain, Bureau of Home Appliances of San Diego County; Ralph B. Hubbard, Rocky Mountain Electrical League, Denver; James L. Schricker, Intermountain Electrical Assn., Salt Lake City; R. L. Wilkinson, Inland Empire Electrical League, Spokane; and J. R. Dooley, Electric Service League of Vancouver, B. C. Exchange of ideas and experiences in appliance, television and adequate wiring promotions was to be the purpose of the meeting.

EMEA

A sellout of all exhibit space insures that the seventh electrical industry show sponsored by the Electrical Maintenance Engineers Assn. of southern California will be the largest of its kind. It is scheduled for Shrine hall, Los Angeles, April 1-3. Exhibits by trade schools and universities on the balcony, added to the complete sellout of space on the main floor for manufacturers' exhibits, will make it larger than all previous shows. Governmental agencies having educational training programs will also exhibit. An exhibitors' luncheon at the Statler Hotel on opening day is planned by the show committee, headed by John J. Singleton of Lever Bros. Co. and Richard Rogers, Ace Day & Night Electric Co., EMEA president.

The new NEMA standards for electric motors was the topic under discussion at the Jan. 20 meeting of the EMEA, with Jack Eastman, chief electrical engineer, Sterling Electric Motors, and John Warner, field engineer, U. S. Electrical Motors Inc., as speakers. Three new directors were also to be elected for a three-year term from among the five nominees, Charles W. Deane, Larsen-Hogue Electric Co., Charles Hayes, The Electrical Estimators, Carl Ladenberger, Southern California Edison Co., Robert Marcum, Hughes Aircraft Co., and Daniel M. Slight, General Electric Co.

IES

Art, design and light will be brought together by an exceptionally top-rank list of speakers at the South Pacific regional conference of the Illuminating Engineering Society, April 19-20, at the San Francisco Museum of Art.

The program will be divided into five parts. It starts with the Monday morning session on light sources. Dr. Grace McCann Morley, director, San Francisco Museum of Art, will discuss "Lighting as an Art Form." "The Incandescent Lamp in Lighting Design" will be shown by a speaker from General Electric Lamp Division, Cleveland. "The Fluorescent Lamp in Lighting Design" will be explained by Marshall Waterman, assistant manager, commercial engineering, Westinghouse Lamp Division, Bloomfield. "Lamps and Lighting in the Future" will be predicted by that past master, Sam G. Hibben, past president of the IES, now retired.

Color will be the subject of the Monday afternoon session, with Walter Granville, color consultant, Container Corp. of America, Chicago, as leader and Don Caverly, Sylvania Electric Products Co., New York, telling of

In charge of the EMEA seventh Electrical Industry Show in Los Angeles Shrine hall, April 1-3, are Richard Rogers, contractor, EMEA president; L. J. Rejda, Westinghouse; Carl Ladenberger, Edison; John Singleton, Lever Bros., the show's director

"Light and Color in Merchandising."

On Tuesday morning there will be parallel sessions on residential and street lighting. E. W. Commery, executive engineer, G-E Lamp Division, Cleveland, will open the residential session with "Light and Color in the Home." "Functional Portables and Fixtures for the Home" will be described by Jack Blitzer, vice-president, Lightolier Inc., New York. IES President Homer Manwaring, Philadelphia Electric & Mfg. Co., speaks on "Architure and Engineering in Lighting Design."

Store lighting will be the subject of Tuesday afternoon's session, with Victor Gruen, architect and store designer, Los Angeles, speaking on "Designing the Shopping Center" and Kenneth C. Welch, architect, J. and G. Draverman Co., Grand Rapids, on "Seeing and Selling with Display Lighting."

The parallel street lighting session, Tuesday morning, will open with a talk by David M. Baldwin, traffic engineer, National Safety Council, Chicago, "Lighting and Night Traffic Accidents." An unusual voice of the one who must use the streets at night will be heard next, Victor Paulsen, Yellow Cab driver, San Francisco, who will give his views on "Street Lighting for the User." "New Developments in Street Lighting Sources" will then be told by Paul Schmidt, lamp engineer, G-E Lamp Division, Oakland. Prof. Dan M. Finch, University of California, will describe and demonstrate the new Finch-Simmons visibility meter he helped develop. That evening after a dinner at Spengers in Berkeley a demonstration of street lighting research problems will be conducted at the UC field test laboratory in Richmond.

Monday night a dinner honoring President Manwaring will be held.

Pacific Northwest regional conference of the Illuminating Engineering Society will be held at the Benjamin Franklin Hotel, Seattle, April 22-23.

Oregon Section, IES, has been having lively discussions over what "or equal" means in talking about fixtures. A two-meeting program, the first Dec. 9, had a panel of experts including Holman J. Barnes, architect, president of AIA—Oregon Section; Glen Emory, electrical contractor; Grant Kelley, electrical engineer; Ralph Tynan, G-E Supply Corp.; and Earl Webb, Webb Electric Mfg. Co., with Donald W. Edmundson, architect, as moderator. The panel gave its opinions and then on Jan. 21 the discussion about these opinions was had from the floor. Another meeting was held Jan. 13 to hear James L. Payne, architect, talk on "Architecture and Lighting—Esthetic and Practical."

Arizona Chapter, IES, heard Max Pooler of G-E Apparatus Division discuss the dimming of fluorescent lamps and Drs. Harold Freeman, Dean Gage and Ross Hendrix discuss vision and seeing at its Dec. 4 meeting. On Jan. 8 J. D. Whitnell, Arizona Public Service Co., discussed street lighting in Phoenix. Matt Cabot, Western division manager, Day-Brite Lighting Inc., San Francisco, talked on school lighting designs for comfortable seeing in the class room.

San Diego Chapter, IES, heard a similar talk on the dimming of fluorescent lamps by R. E. Mann, G-E, Los Angeles, and on series vs leadlag fluorescent ballasts by E. F. Larson of Westinghouse Lamp Division, Los Angeles, in December. Matt Cabot also addressed the San Diego Chapter on Jan. 7.

Southern California Section study club heard from Prof. Edgar B. Van Osdel, speaking and showing lantern slides of Mt. Wilson Observatory, in December. Martin G. Rock, Los Angeles police department, traffic bureau, spoke on "Your Stake in Traffic Safety Lighting."

APDA

American Power Dispatchers Assn., Southwest area, heard G. Foster Rucker, Leeds & Northrup Co., describe the late developments in automatic control of electric power flow over tie lines between interconnected utility systems in Los Angeles Jan. 8. B. P. Bengtsson, Los Angeles Department of Water & Power, chairman,

presided with Charles M. Merril, Glendale Public Service Department, program chairman. R. W. Mort, central dispatcher, Southern California Edison Co., founder of the APDA in the area, commended the organization for progress made and favorable recognition gained in the industry.

PCEA Panorama

Code Revision

Chairman F. E. Strauss, code and ordinance committee, has announced that the committee has completed its work on necessary revisions for production of a 1953 edition of the Uniform Electrical Code. The new edition of the code will conform to and adopt the wiring regulations of the 1953 National Electrical Code. The 1953 Uniform Electrical Code has been submitted to the Attorney General of California for approval and adoption by reference and is now being printed.

Hawaiian members of PCEA are seriously contemplating a change in their meetings. Instead of holding a Hawaiian conference annually as in the past four years, it has been proposed that they hold such a conference only every other year. During the years in which no annual conference is scheduled, they are considering the establishment of workshop-type meetings of each of the three sections, similar to those held on the mainland each year by the Business Development, Administrative Services and Operating Sections.

Speaking of annual meetings and conferences, Chairman L. M. Guibara, convention committee, reports that all the convention committees are making fine progress on their convention assignments. From all indications the convention this year will set a new high in big-name speakers, attendance and entertainment.

Changes

Two substitutes in local chairmen for the regional meetings of the Business Development Section have been announced. Chairman for the Sonoma Mission Inn meeting, Feb. 24, will be H. V. Patton, PG and E, instead of W. F. Pape. The March 2 meeting at Marysville will be headed by F. Y. Kraft, PG and E, instead of W. R. Bowler.

Because of a change of duties in his own company, H. B. Wylie, San Diego Gas & Electric Co., has resigned as sponsor of the transportation group, Engineering and Operating Section. President Pengilly has appointed W. H. Brown, Southern California Edison Co., to replace Wylie, both as chairman of that group and as a member of the section's guidance committee. Chairman Brown will preside over the transportation group's meeting at the section conference in San Francisco, March 18 and 19.

New Committee

The board of directors has authorized the appointment of an air conditioning and room cooler committee. H. C. Rice, Southern California Edison Co., has been appointed chairman and the committee is now being formed. Function of the new committee is to study problems resulting from the rapid growth and interest in air conditioning equipment. Typical of these is the fact that existing wiring, in many cases, is not adequate for efficient operation of the new coolers. Also, a method of delay, or some other solution, must be worked out to prevent the problem which arises after a power interruption on a circuit with a large number of air conditioning units.

Joint Meeting Planned

An innovation this year in the affairs of the Personnel Section of the Northwest Electric Light & Power Assn. will be a joint meeting with the Industrial Relations Committee of the Edison Electric Institute on July 12-13 at the Multnomah Hotel, Portland. An additional day, July 14, will be utilized by the Personnel Section to wind up its own Northwest affairs.

In coming to Portland for this joint meeting, the EEI committee follows out a policy of carrying its meetings to different sections of the country and meeting jointly with some of the regional utility associations. Program for the Northwest meeting will be developed by F. R. Rauch, chairman of EEI Industrial Relations Committee, and Pat Holton, Utah Power & Light Co., chairman of the Personnel Section of the Northwest association. Local arrangements in Portland are in the hands of C. Herald Campbell, Pacific Power & Light Co., and Russell James, Portland General Electric Co.

Major subjects tentatively set up are supervisory development, communications within the company, and collective bargaining and contract administration. These subjects would be presented by panels followed by a "buzz session" of questions with answers by panel members. The program makers will seek a wide geographic distribution on the several panels, with participation in particular from the other Western associations, PCEA and RMEL.

Plans for the entertainment of the visiting delegates will include visits to points of interest in the vicinity of Portland.

NWEL&PA at Spokane

Accounting and Business Practice Section of the Northwest Electric Light and Power Assn. will hold its 1954 conference in Spokane, May 20-21. Allan F. Elder, Washington Water Power Co., as chairman of the section, will develop the program from the ideas put forth at a recent executive committee meeting.

A. Tye, Washington Water Power Co., was appointed chairman of arrangements. The meeting will have the annual banquet as one of its features, and a trip to some point of interest near Spokane will be arranged for the delegates for Saturday, May 22.

As a part of the program, the delegates will spend a half day visiting the accounting department of Washington Water Power Co., where members of that company's staff will explain the procedures used in the company's system, and from these explanations the delegates can measure their own operations in their own companies and probe the host company and each other for ideas. The rest of the two-day session will be devoted largely to panel discussions of timely topics. On one half day there will be parallel sessions of customer accounting and general accounting subjects so that more points in each field of accounting can be covered.

Electric Clubs

Electric Club of Washington will sponsor a scholarship for a deserving student at the University of Washington, majoring in electrical engineering. It will be under the direction of Bob Lemman, chairman of the club's scholarship committee. Details of the scholarship, which will run between $100 and $150 on a continuing basis, will be worked out by the committee in conjunction with the proper representative of the university engineering staff and will then be submitted to the University Board of Regents for approval.

Harry Lee, newly appointed San Francisco division manager, PG and E, has been elected president of **San Francisco Electric Club,** to succeed Frank Bodine, Westinghouse Electric Corp., on March 1. Charles L. Huyck was re-elected secretary-treasurer. Three new directors were also elected.

ELECTRICAL WEST

New Chief for BPA

APPOINTMENT of Dr. William A. Pearl of Washington State College as Bonneville Power Administrator has been universally acclaimed throughout the Pacific Northwest. Everyone expects this able engineer, educator and executive to implement and administer a program of local cooperation and partnership based upon the power policies announced by Interior Secretary Douglas McKay.

One thing is certain: The intensive campaign for creation of a federal superpower bureaucracy and for organizing the region into local public power agencies is at an end. The era of propaganda in favor of public power and of harrassment of private utilities that started when BPA was organized is now closed.

The new policy shift which assures cooperation between public and private utilities and local, state and federal governments should have a vital effect upon the power economy of the Pacific Northwest. Events already foretell an end to the power shortages that have plagued the region. Dr. Pearl can be expected to give leadership to this program to the end that the full energy requirements of the area will be met.

Tightening Up the Cinches

WHEN the going promises to be a bit rugged old hands with the pack horses stop and tighten up the cinches so that the saddle or the pack will not slip and throw horse or rider off balance. Well, to old hands the beginning of 1954 looks like a time to cinch up and make sure the pack or rider will come through riding on top.

For the easy going seems to be behind. The climb ahead will take work and careful footing. A slip can bring disaster.

There are signs of panic among the tenderfeet and the mavericks. But a tough climb doesn't scare a thoroughbred. Makes the ride more interesting.

So it will be with selling in 1954. The thoroughbreds will cinch up their businesses. The going may be rough but they'll make it in spite of the few who in panic throw ethics and good practices to the winds. It looks like a year that would separate the men from the playboys.

Too Much Foreign Competition

FOREIGN competition with American electrical manufacturers is increasing. Here in the Far West virtually every big order for equipment for installation by agencies of government has had from two to six or seven foreign bids. During the past year a number of orders went to foreign companies. Now, with backlogs vanishing, American manufacturers are looking for ways to fight back.

General Electric Co. is seeking reconsideration of the award of two McNary Dam generators by the U. S. Army Engineers to English Electric Co. Basis for the request is the charge that American workmen will lose wages for 1,000,000 man-hours of work and the U. S. will be deprived of $1,159,000 in taxes. The wage bill is estimated at $2,000,000. A similar situation threatens in the case of governor equipment for The Dalles Dam where a Japanese and an Italian firm each have underbid U. S. manufacturers.

Situations such as these spotlight the wide differences in two historic policies that have guided U. S. foreign business relationships. One is the historic policy of maintaining and improving the American standard of living by erecting tariff barriers and of encouraging U. S. consumption of U. S. made goods by such laws as the Buy American Act. The other is the policy of strengthening the U. S. by strengthening its allies. Here the plan is to remove in so far as possible restrictions on importing foreign goods. It finds expression in the slogan, "Trade—not Aid."

The two are not compatible. National interest cannot be met by attempting to operate under both policies simultaneously. We do not propose to suggest which is more

EDITORIAL VIEWS

desirable under today's troubled international conditions. We are merely pointing up the threat this foreign competition holds out to American industry and the American standard of living.

Tell the Public More

SELDOM does a metropolitan newspaper editor appreciate the many interesting incidents that befall the customer contact employees of electric companies. This was brought to our attention recently by a full page picture story in the *Denver Post* telling about the unusual experience of Public Service Company of Colorado meter readers. The story surely must have given many people a better understanding of just one routine function in the highly complex business of running a utility. More stories of this nature would build greater public appreciation of the human side of our business.

Public Is Becoming Aware

ONE of the most surprising and encouraging results from the television spot program of advertising being done by the industry through the Northern California Electrical Bureau is the public response to the brief hints that they do something about their inadequate wiring. For so many years the industry's efforts to awaken the public have been like shooting into a sand bank. To have 300 postcards a week sent in asking for information is a new experience.

This is both a proof of the effectiveness of television as a medium for reaching right into the home and of the growing awareness of homekeepers of a need they did not realize before, one for more convenience and adequacy from their wiring. For at best the one-minute television spots, run in at the end of an entertainment show, can only make a hint, a suggestion. They cannot begin to sell what may seem an expensive job to a home owner. Yet they do make them aware. They arouse their interest. They cause them to write for more information. These are the first steps necessary to a sale.

If the wiring contractors and their allies, the union and the suppliers, do not ready themselves to complete the sale it will be a real opprtunity lost. Already some none too ethical operators are employing the freezer plan high-pressure tactics to capitalize on this tremendous rewiring market. The legitimate electrical contracting firms, especially those doing house wiring, should set themselves up to follow through and to sell this potential business.

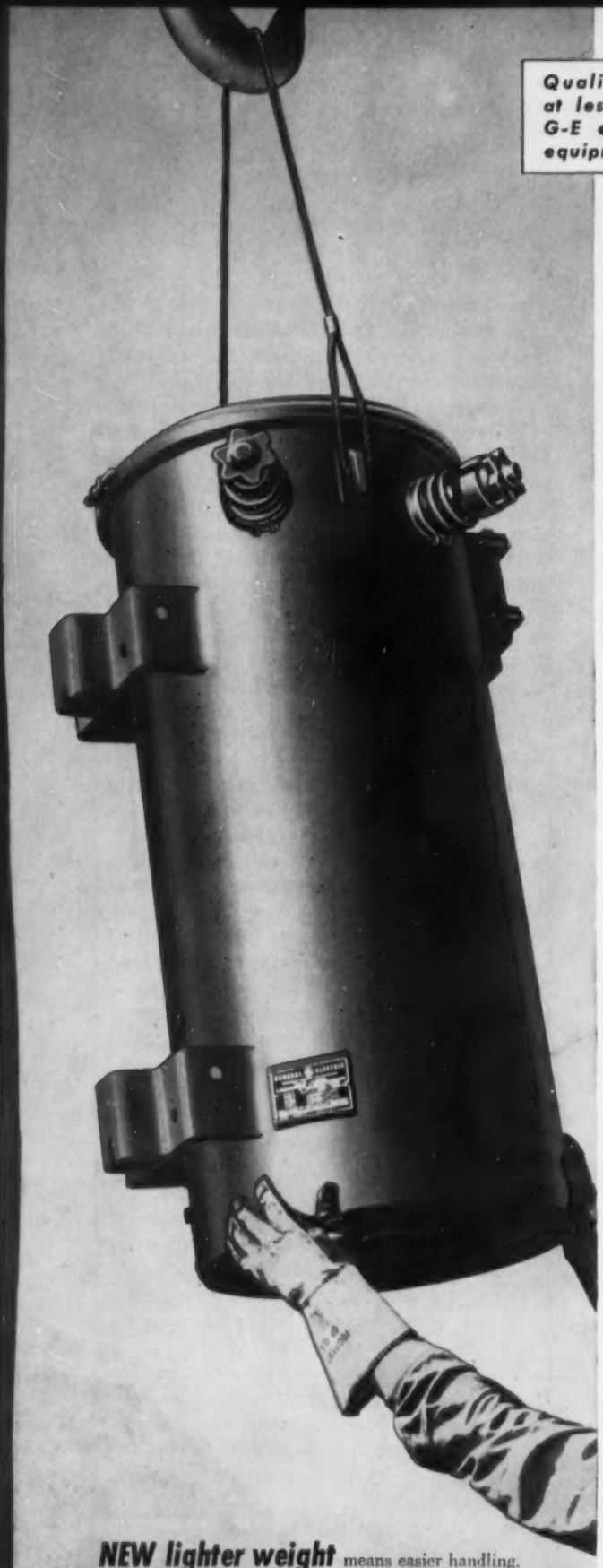
You Can Say That Again

BUSINESS leaders cannot afford to be philanthropists. They can't waste business money. Their obligation to their employees and their stockholders is to battle for markets, to create better and cheaper products . . . So this must happen: Business must continue to expand, to produce more, to spend more for promotion, research and development. Business men must recognize what Dr. Richard Gettell of Time *has been saying, that the term "market saturation" is a misnomer; the product of static thinking. Over time, human desires are fundamentally insatiable. A market is saturated only at a given moment, and at a given price. So business ingenuity is required to increase marketing efficiency, to cut the costs of physical distribution, to pass the savings on in lowered prices. Distribution efficiencies will have to be substantial to keep pace with the daily miracles of production efficiency. And business ingenuity is required to improve its techniques of selling, advertising and promotion, to create new and larger demand, to revive the nearly lost art of competitive selling, to use contracyclical advertising — to move goods by intelligent and aggressive salesmanship. We ought to tell that story again and again.*—J. K. Lasser, J. K. Lasser Co.

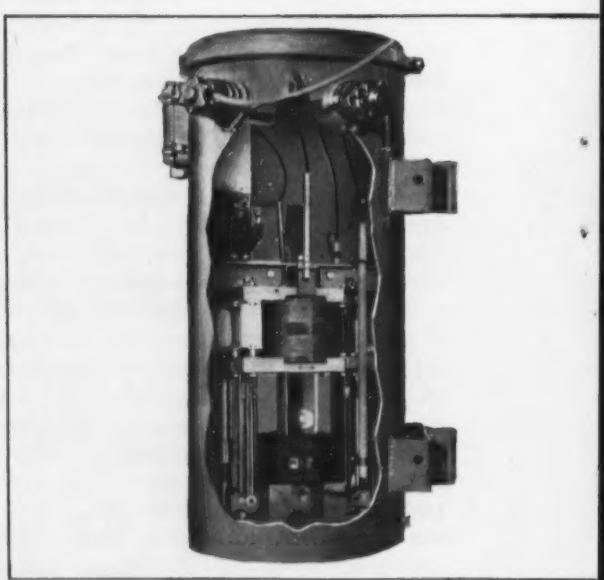
Quality lighting at less cost with G-E engineered equipment.

ALL NEW G-E Constant-current TRANSFORMER for Street-lighting Systems

up to 33% lighter

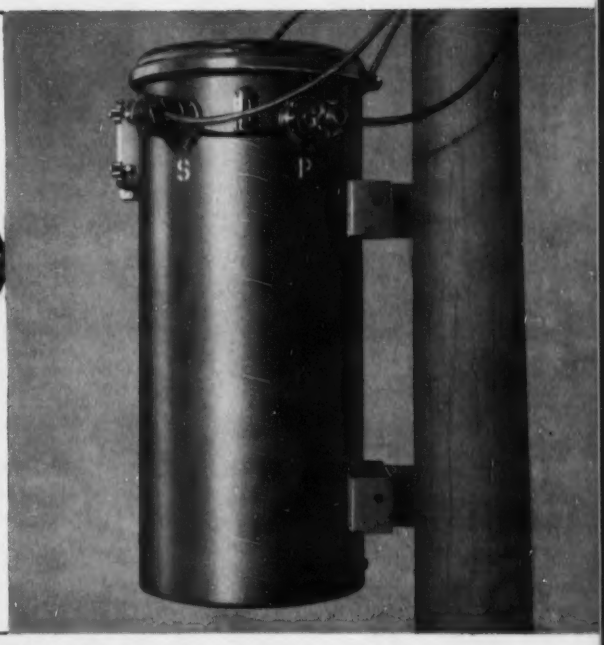


NEW lighter weight means easier handling. RO2 transformer, including oil, is 20% and 33% lighter in the 10-kw and 30-kw sizes respectively.



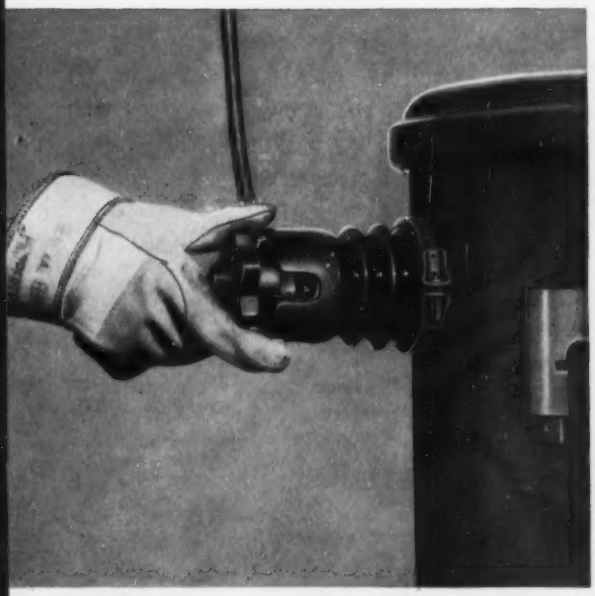
NEW faster response to load changes from radically new design which eliminates counter balance, introduces parallel straight-line motion, cuts down friction points.

NEW easy adjustment is accomplished from the outside through convenient access door located above the oil level. Transformer cover need not be removed.



NEW easy mounting cuts installation time. Special slotted mounting bracket allows direct-pole mounting of models up to and including the 20-kw size.

. . . and far easier to install and maintain



NEW simplified connections, quickly, without tools, by inserting the cable from either direction into the bushings and tightening the insulated handwheel.

G.E.'s new CC transformer for street lighting represents the most sweeping design advance in the industry in 50 years.

LESS FRICTION—It uses the magnetic suspension principle to completely support its moving coil. Thus, the only points of friction in the entire assembly are the two sleeve ball bearings which direct vertical movement of the moving coil.

LIGHTER WEIGHT—The new CC transformer is lighter and more compact, permitting pole mounting of larger ratings than was possible before. Grain oriented silicon strip steel in the core and aluminum wire in the moving coil conserve space and weight.

GREATER CONVENIENCE—Easy installation and servicing are assured by the simple mounting bracket, the cable bushings with their insulated handwheels. The access door on the side of the tank permits adjustments without removing the cover and reaching below the oil level.

VERSATILE—Designed to supply constant current for series street-lighting circuits, this new G-E CC transformer will operate efficiently with any type of lamp load.

MORE INFORMATION—Is available from your nearest G-E Apparatus Sales Office or authorized G-E street-lighting agent. Or write for Bulletin GEA-5975, Section 452-137, General Electric Company, Schenectady 5, N. Y.

You can put your confidence in

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

THE MONTH IN BRIEF

Two Merger Plans Announced

Negotiations for purchase of Coast Counties Gas & Electric by Pacific Gas and Electric Co. and for merger of Pacific Power & Light and Mountain States Power companies were underway last month.

PP&L-Mountain States

Merger of Pacific Power & Light and Mountain States Power companies has been approved by directors of the two utilities and will be submitted to their stockholders on March 12, it was announced by PP&L President Paul B. McKee and Mountain States Board Chairman Z. E. Merrill. Consolidation of the two operations would greatly strengthen ability of the companies to meet present and future service requirements and to support development of the region, it was stated. The plan calls for stock exchange on the basis of nine shares of Pacific for each ten shares of Mountain States common; one share of Pacific $100 par value preferred for each two shares of Mountain $50 par value preferred. The merger, which would have to be approved by state and federal regulatory bodies, has been under discussion for the past two years. Pacific, with capitalization of $108,000,000, has 151,000 electric customers in Oregon and Washington; annual operating revenues of $21,985,000. Mountain States serves 72,000 electric customers in Oregon and 40,000 in Idaho, Montana and Wyoming. It has a capitalization of $44,400,000; annual operating revenues of $15,571,000.

PG and E-Coast Counties

A plan to purchase Coast Counties Gas & Electric Co. was announced last month by Pacific Gas and Electric Co. President James B. Black of PG and E said the company would exchange its common stock for majority stock of Pacific Public Service Co., holding company for Coast Counties. PG and E will exchange 330,535 shares of its stock for 623,651 shares of Pacific Public Service common, representing 84% control, now held by Blythe & Co., investment firm. It will make a similar offer to minority holders of the remaining 118,329 shares. It will then apply to the California PUC and the SEC for authority to issue PG and E stock to be exchanged for the preferred stocks of Pacific Public Service and Coast Counties. The deal will give PG and E electric distribution facilities and service in four counties and gas facilities and producing gas wells, a water distributing service and other subsidiary operations of Pacific Public Service and Coast Counties in northern and central California.

McNary Allocation Questioned

Charging errors in interim allocation of McNary Dam costs by the Federal Power Commission, Northwest Public Power Assn. last month filed petition for intervention and application for rehearing on the cost question. The association maintains that the legislative history of the project supports at least a 20% allocation of total construction costs to navigation and, if the Bonneville allocation be a precedent, at the very maximum a 50% allocation of joint costs to power.

Commissioner May Be Elected

A proposal to make Oregon's public utilities commissioner an elected official may be on the next general election ballot in that state. Preliminary petition for an initiative question was filed Jan. 6 with the election bureau by State Representative Monroe Sweetland (D). The commissioner is now appointed by the governor.

Utility Employees Testify

Twelve public utility employees were questioned at closed hearings of the California State Senate Committee on Un-American Activities in Los Angeles last month. The hearings were described as preliminary and exploratory and will be followed by similar closed sessions and later by public hearings. The 12 who testified were from Southern California Edison, Southern California Gas and Pacific Telephone & Telegraph.

All Loads Can Be Served

All BPA's firm and interruptible power loads can be served throughout the storage drawdown period ending April 15 even if critical stream flow occurs, Administrator William A. Pearl said late last month. He reported that the Northwest Power Pool will be operating with large peaking surpluses; that BPA plans to fill Hungry Horse reservoir to full elevation by September 1954. On Jan. 20 a new instantaneous peak of 3,323,000 kw was recorded for the federal system.

Langlie Challenges Proposal

Washington State citizens stand to save $14,000,000 annually in power costs if Hells Canyon Dam is not built by the federal government, Governor Arthur B. Langlie declared in a Spokane interview last month. Asked why he sent his power advisor, Holland Houston, to testify before the FPC, he said that until Houston challenged the federal proposal "there was no responsible voice raised against Hells Canyon." Stating that "nobody seemed to have any information on federal projects except the federal government and yet our citizens were being asked to pay the costs of projects without understanding them," he said he selected Houston "to develop conclusions."

Baker River Dam Proposed

Puget Sound Power & Light Co. has applied for a FPC permit to study a hydro project on the upper Baker River in eastern Whatcom County, Wash.

MAKE THE JOB EASIER with XO CIRCUIT BREAKERS

You'll find that XO breakers are EASIER TO SELECT!

I'm sold on XO breakers because they're EASIER TO BUY!

Know why I like 'em? Because they're EASIER TO INSTALL!

I give the nod to XO breakers because they're EASIER TO LIVE WITH!

Here's why XO Breakers are—

EASIER TO SELECT!

Wide Range of Devices, 1 to 32 Circuits • Main Breakers or Main Lugs • 1 Phase 3 Wire or 3 Phase 4 Wire • Available in either General Purpose or Raintight Enclosures

EASIER TO BUY!

Off-the-Shelf Delivery from Distributor's Stock • Only 3 Basic Components: Box-Interior, Breakers, and Cover • Simplified Packaging

EASIER TO INSTALL!

PLUG-IN BREAKERS: Load Lugs Easily Accessible from Front • No Wire Looping • ENCLOSURES: Matching Knockouts • Plenty of Wiring Space • Adjustable Interiors

EASIER TO LIVE WITH!

Attractive Appearance • Rugged Breaker Design • Positive Operation • Long Life • Ambient Compensated • Non-Interchangeable Units discourage tampering

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

Watch for Square D's Display Coach—Now on Tour!

A triple threat fire truck to fight oil field fires is reported to have been perfected by the Seagrave Corporation of Columbus. Unlike ordinary fire-fighting apparatus, the new truck is designed to snuff out oil field and refinery fires any one of three ways; by squirting out 2800 gallons of water a minute, 1300 pounds of dry chemical compounds, or 19,000 gallons of fire-smothering "foam". In an emergency, all controls on the 20,600 pound unit can be operated by one man.

To utilize low grade ores previously stockpiled, Kaiser Engineers has designed and built a new beneficiation plant at Eagle Mountain Mine, California. The new plant will increase the iron content of the ore shipped and thus further reduce the operating costs of the West's only completely integrated steel plant, 163 miles away. Incidentally, 51 miles of this distance is over the standard gauge railroad designed by Kaiser Engineers to cross the Southern California desert and connect the mine with the tracks of the Southern Pacific.

Temperature Measurement in Engineering, described as a "how to" book for the proper design, performance, and operation of temperature measurement installation, has just been published by Wiley. The authors of the new book are H. Dean Baker, E. A. Ryder and N. H. Baker.

Kaiser Engineers has a large staff of engineering and construction experts ready to tackle your problems in all fields of design, engineering and construction. Call or write: Kaiser Engineers Division of Henry J. Kaiser Company, Kaiser Building, Oakland 12, California.

THIS MONTH'S NEWS

Company President Answers "Partnership" Critics

Political motives behind criticism of the "partnership" plan of five Pacific Northwest private utilities to build two hydroelectric dams in Idaho (EWEST, January, p 92) has prompted President Paul B. McKee of Pacific Power & Light Co. to defend the joint proposal.

He spoke out in answer to charges by Oregon State Senator Richard L. Neuberger, Portland Democrat, who had declared the "state of Oregon can only suffer by the piecemeal type of multipurpose river development contemplated by the five power companies on the Clearwater River, more than 400 miles from here (Portland), in Idaho." He added, "A river system must be treated as a unit, not chopped up into helter-skelter pieces."

The McKee statement declared: "Neuberger plainly is more interested in building up a fake political issue than he is in building dams to support the growth of the Pacific Northwest. The Clearwater River plan that he opposes is exactly the same plan the Army Engineers are recommending as part of the over-all development of the Columbia River basin. The five companies are proposing to build the same type of dams to accomplish the same purposes at the same points on the river."

McKee spoke up a few days before Secretary of the Interior Douglas McKay, speaking in Portland to a statewide Republican party assembly, took his home-state party leaders to task for not standing up to critics of the Eisenhower power program. McKay specifically mentioned Neuberger in his talk and said Republicans—and businessmen, who he said had too much at stake to be quiet—were undermining public confidence in the administration by their silence.

PUDs Should Buy Federal Dam, Not Build, Official Says

Rather than build new dams, the Chelan, Okanogan and Douglas County PUDs of central Washington State should attempt to purchase Chief Joseph Dam from the federal government, Art Garton, former state director of conservation and development, has suggested.

All three of the PUDs have filed applications with the FPC to construct low-level dams. Garton believes it would be cheaper for them to buy Chief Joseph from the government, under the Eisenhower administration's plan to return public power projects to local authorities.

Chief Joseph Dam, costing nearly $200,000,000 will have an ultimate capacity of 1,728,000 kw, making it the second-largest hydroelectric power producer in the world. The first four 64,000-kw generators are scheduled to go on the line next year.

Preliminary Draft Expected On Columbia River Compact

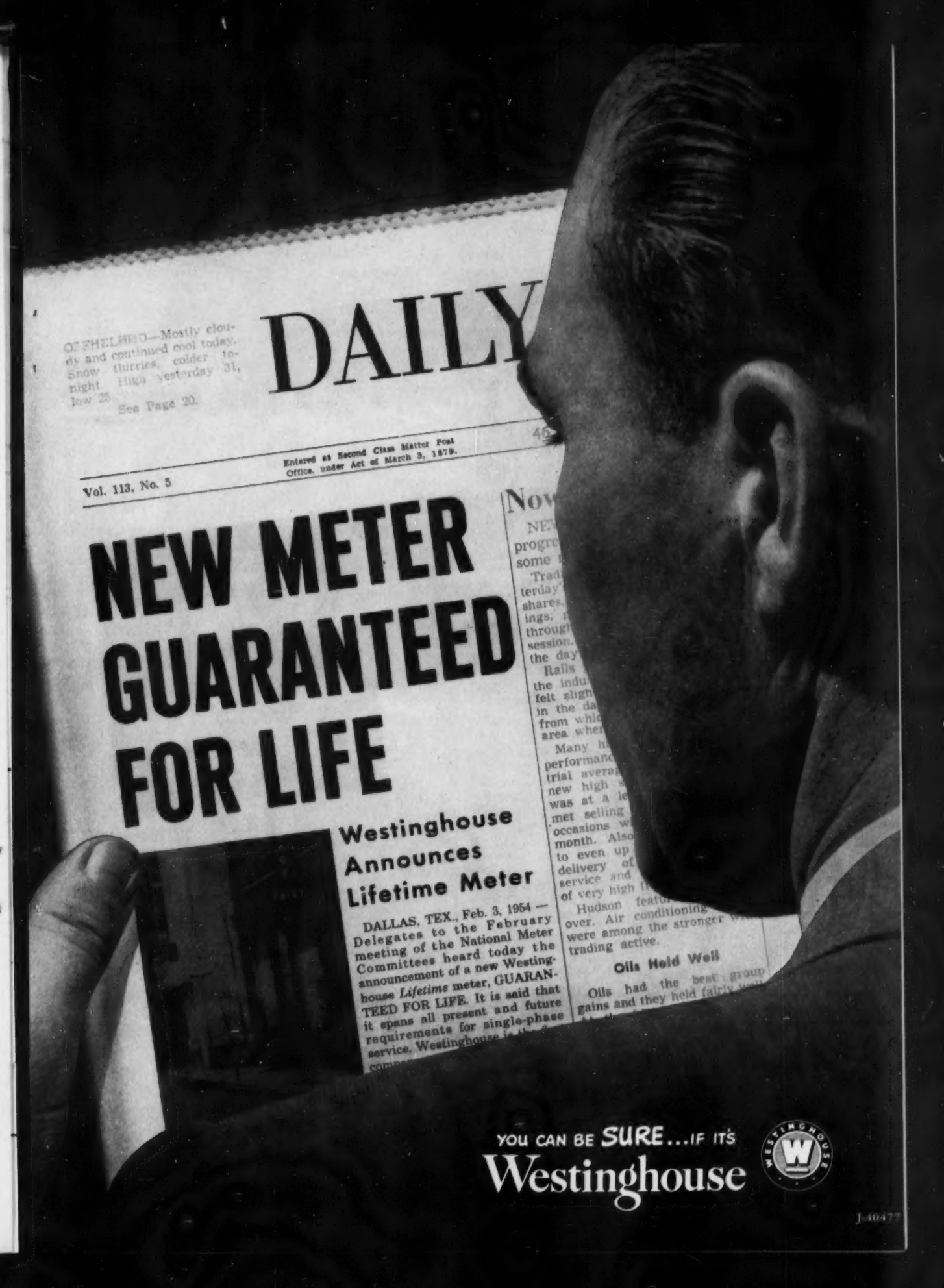
Members of the Columbia River Interstate Compact Commission hoped to begin writing a preliminary draft of a compact by the end of January. The actual framing will be done by Frederick L. Zimmermann of New York City, who was to meet the compact commission executive board in Spokane Jan. 29.

Research director of the Joint Legislative Committee on Interstate Compacts for New York, Zimmermann has been acting as consultant to the Columbia Basin group. He was instrumental in writing the Missouri River Basin Compact.

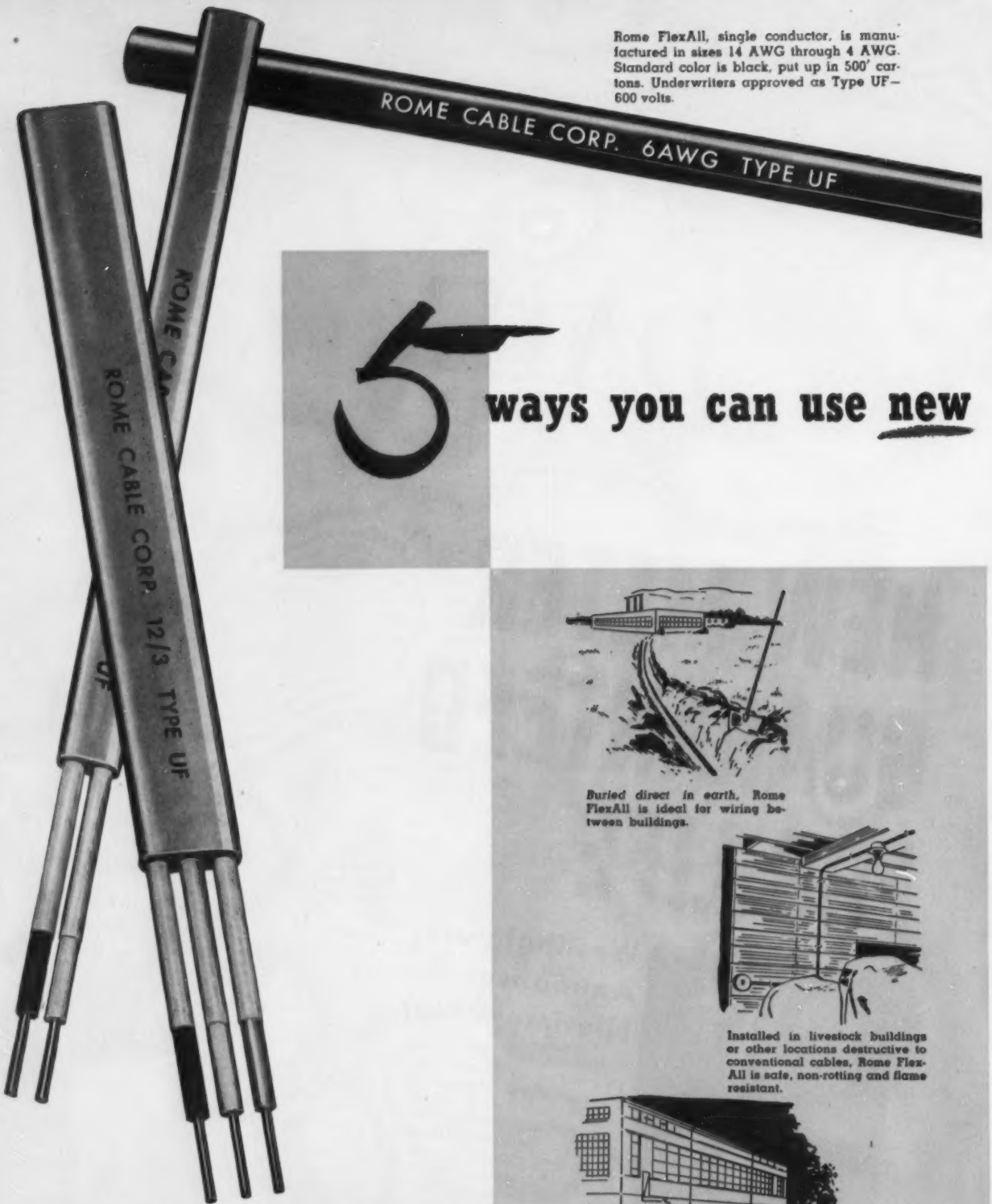
Any compact among the states in the Columbia River watershed, Zimmermann pointed out in an address in Spokane recently, must be approved by each state legislature, signed by each governor, approved by Congress and signed by the President.

Consent legislation for the compact has already passed Congress and the legislatures of Washington, Oregon, Idaho, Montana and Wyoming.

• **The U. S. Fish & Wildlife Service** has received approval of a program to investigate the potentialities of sound in guiding young fish downstream past Columbia River dams, according to an announcement at Seattle by Clinton E. Atkinson, chief of the service's Pacific salmon investigations. The Corps of Engineers has allotted $15,000 for the first year's work. An experimental tank and a sound generator now are being constructed, to send out both continuous and pulsating sound waves of frequencies ranging from 20 to 50,000 cycles a second.


DAILY
Vol. 113, No. 5
Entered as Second Class Matter Post Office, under Act of March 3, 1879.
NEW METER GUARANTEED FOR LIFE
Westinghouse Announces Lifetime Meter
DALLAS, TEX., Feb. 3, 1954 — Delegates to the February meeting of the National Meter Committees heard today the announcement of a new Westinghouse Lifetime meter, GUARANTEED FOR LIFE. It is said that it spans all present and future requirements for single-phase service.
Oils Held Well
YOU CAN BE SURE...IF IT'S
Westinghouse
J-40477

Rome FlexAll, single conductor, is manufactured in sizes 14 AWG through 4 AWG. Standard color is black, put up in 500′ cartons. Underwriters approved as Type UF—600 volts.

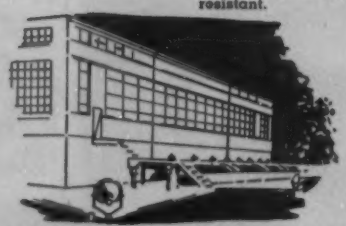


Two and three conductor Rome FlexAll is manufactured in sizes 14 AWG through 10 AWG. Standard color is pearl gray, put up in 250′ cartons. Two conductor construction is available with or without ground wire. Underwriters approved as Type UF and Type NMC—600 volts.

5 ways you can use new

Buried direct in earth, Rome FlexAll is ideal for wiring between buildings.

Installed in livestock buildings or other locations destructive to conventional cables, Rome FlexAll is safe, non-rotting and flame resistant.



Rome FlexAll is ideally suited for the underground wiring of floodlight installations.

Another Rome product that reduces inventory, saves money!

You will find Rome FlexAll a high quality product, economically priced, and fully approved for multi-purpose use under the 1953 National Electrical Code. It reduces inventory, it is easy to handle, it is safe.

Rome FlexAll to cut installation costs

DESIGNED for multi-purpose use, Rome FlexAll is economical, safe, neat appearing and has excellent resistance to the hazards of wet or corrosive locations. They are no longer wiring problems.

A new product of Rome engineering, Rome FlexAll is available with single, two and three conductors for branch circuit and feeder services. It is the answer to low cost industrial and commercial wiring, as well as the wiring of amusement areas, outlying farm buildings and residences.

Specifically, Rome FlexAll, single conductor, is approved by Underwriters' Laboratories, Inc., as Type UF (Underground Feeder), while the two and three conductor constructions are approved as, both, Type UF and Type NMC (Non-metallic Sheathed Cable—Corrosive Resistant). Such dual approval makes Rome FlexAll the inventory-saving choice for branch and feeder circuit work.

Rome FlexAll is recognized by the National Electrical Code for 1953 for the following types of installation:

Single Conductor

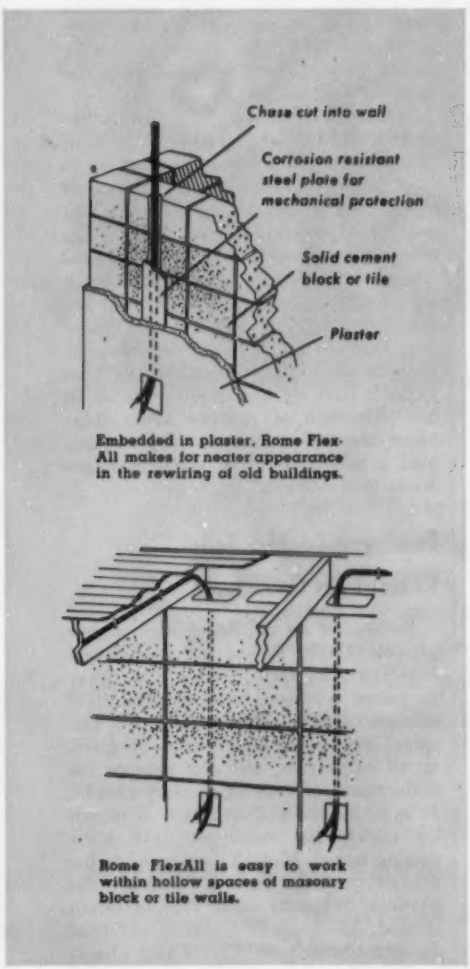
- For branch or feeder circuits *buried directly in earth when* provided with over-current protection.

Multiple Conductor

- For branch or feeder circuits *buried directly in earth,* as above.
- For interior wiring, either exposed or concealed in dry, wet or corrosive locations.
- For installation within hollow spaces of outside or inside masonry block or tile walls.
- For embedding in plaster or shallow chase in masonry, when suitably protected.

Rome FlexAll, single conductor, has an integrally applied all-resistant Rome Synthinol, Type TW, thermoplastic insulation and sheath. Rome FlexAll, two and three conductor, is insulated with the same high quality compound, with individual conductors covered with an inorganic glass yarn wrap. Over the assembled conductors is an abrasion, moisture, rot- and flame-resistant Rome Synthinol thermoplastic sheath.

If your wiring requirements involve *direct burial in earth* or *the hazards of wet and corrosive conditions . . . ask for Rome FlexAll.*



Embedded in plaster, Rome FlexAll makes for neater appearance in the rewiring of old buildings.

Rome FlexAll is easy to work within hollow spaces of masonry block or tile walls.

ROME CABLE Corporation
ROME · NEW YORK
and
TORRANCE · CALIFORNIA

It Costs Less to Buy the Best

WESTERN SALES OFFICES AND WAREHOUSES

SALT LAKE CITY 1, UTAH — 230 South 4th West St.
EAST LOS ANGELES 22, CALIF. — 2510 South Malt Avenue
SAN FRANCISCO 24, CALIF. — 1100 Selby Street
SEATTLE 4, WASH. — 3430 Fourth Ave., So.
DENVER 3, COLO. — 1160 Eliot St.
PORTLAND 5, ORE. — 1020 S. W. Taylor St.

Where Lighting Keeps Pace With MODERN SCHOOL PLANNING

New Sylvania IC Fluorescent Fixtures meet highest standards of new Thomas Jefferson Junior High School, Clairton, Penna.

Notice the soft, well-diffused light provided by these Sylvania IC Low-Brightness Fluorescent Fixtures in this modern classroom installation. *Architect:* Joseph Hoover, Hoover Bldg., Pittsburg, Penna. *Electrical Engineer:* Elwood S. Towers, Investment Bldg., Pittsburgh.

In planning this handsome new junior high school, educational authorities, architects, and lighting engineers agreed that the new Sylvania IC Low-Brightness Fluorescent Fixtures met their strict requirements for uniform light distribution, quick easy installation, low maintenance, and attractive appearance. The 40-watt T-17 low-brightness lamps minimize reflected glare, and the excellent 42° crosswise shielding shields the lamps from direct view.

Writes Mr. Joseph Hoover, Architect of this up-to-the-minute school: "In designing school buildings, we endeavor to provide the most efficient classrooms and facilities possible. The Jefferson Junior High is an example of this idea in operation. Essential to these requirements is proper lighting, providing even distribution, correct intensities, easy maintenance, low replacement, and competitive costs. We believe the Sylvania IC Units meet these requirements."

Let us give you full information concerning the many advantages of Sylvania's new line of IC Fluorescent Fixtures. For illustrated folder simply address Sylvania, Dept. 4X-2602, today.

SYLVANIA

Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y.

In Canada: Sylvania Electric (Canada) Ltd., University Tower Bldg., St. Catherine St., Montreal, P. Q.

LIGHTING · RADIO · ELECTRONICS · TELEVISION

POWER COMPANY SIGNS OPEN-SHOP CONTRACT

California Electric Power Co., after seven years with a union shop, has signed an open-shop contract with Local 47, AFL International Brotherhood of Electrical Workers.

The contract gives a 5c-per-hour wage increase, an additional 5c per hour for electric employees required to climb poles or structures in performance of duties, limited double time for emergency call-outs and other improvements. It is effective indefinitely with provision for reopening by either side.

Calectric President Albert Cage announced in September, before negotiations opened, a "right to work crusade" to restore to employees "the right to decide for themselves whether they shall belong to a union."

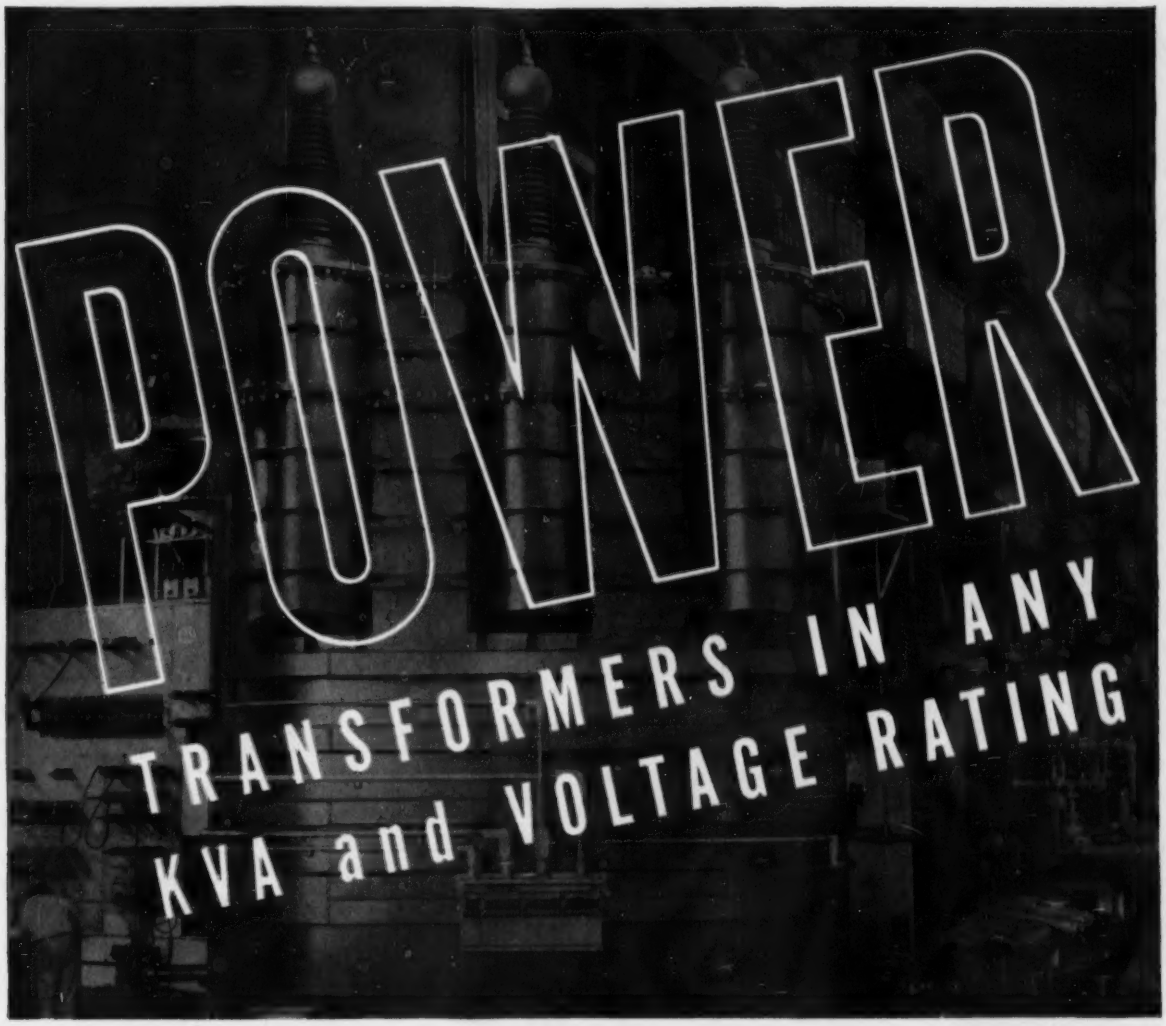
Cage said the company's stand resulted from "abuses of the union shop" during a 23-day strike in March. The strike was the result of breakdown in negotiations begun in December 1952. It ended with the union accepting terms essentially the same as those first offered by the company.

The new contract, which was negotiated without any outward signs of stress, contains a no-strike pledge.

A letter sent to bargaining unit employees after signing of the contract had this comment: "The company recognizes the legal right of employees to choose their bargaining agent. The company believes that organized labor performs a necessary function. With the re-establishment of open shop, the company hopes and expects that we are moving ahead in the direction of mature labor relations, mutual confidence and respect, and a better spirit of labor-management cooperation."

Employee Booklet Tells Reasons for Deductions

Following an employee vote of approval, Utah Power & Light and Western Colorado Power Co. have prepared a revised and enlarged 1954 edition of "Pay Yourself First." The spiral-bound booklet, which is given to all employees, tells the reasons for deductions on wage and salary checks. It explains the deductions as a means by which the employee sets aside money to pay himself and provide for security. All the various items are explained. What to do in case of death is told. Methods of figuring personal financial worth are given and charts to set down due dates for various payments, such as personal insurance, are provided in the unusual booklet.



MOLONEY has the capacity to manufacture power transformers of any Kva and voltage rating. When utilities and industrials use Moloney equipment, they obtain the benefits of all the experience and knowhow of over 57 years of engineering, designing and fabricating transformers. This experience produces a better transformer, which, when installed, will give better performance, have greater reliability and require less maintenance. For further information contact your nearest Moloney representative.

ME 53-8

MOLONEY ELECTRIC COMPANY

Manufacturers of Power Transformers • Distribution Transformers • Load Ratio Control Transformers Step Voltage Regulators • Unit Substations

MOLONEY ELECTRIC = { BETTER PERFORMANCE / GREATER RELIABILITY / LESS MAINTENANCE

SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS, MO. AND TORONTO, ONT., CANADA

for MERCURY Lighting
It's Revere
ELECTRIC MFG. CO. CHICAGO, U.S.A.
ISLAND LIGHTER No. 3048
shown with 300-500 watt TOP FLOODS
Whenever the job requires a great spread of glare-free light, such as at Gas Station Pump Islands, here is a unit that will give more than twice the light of Incandescent—its quality approaching that of daylight. Designed for use with J-H 1 Mercury Vapor Lamps. Unit built around a strong harp shaped frame with hollow arms to facilitate wiring. Reflector 26" wide. Dome casting accommodates up to 5 top floods. Other features make unit tops in quality and low maintenance.
No. 3048
WRITE FOR LITERATURE
"69'er" Area Light
An ideal unit for use at Service Stations, Loading Docks, Truck Weighing Stations, Factory Entrances, etc. Provides a bright uniform spread of glare-free light featuring low upkeep cost. 14" glass. Reflector is Alzak. Designed for 400 watt E-H 1 or J-H 1 Mercury Vapor Lamps.
No. 3069
REVERE ELECTRIC MFG. CO. 6016 BROADWAY CHICAGO 40, ILL.
INDOOR & OUTDOOR LIGHTING FOR EVERY NEED
USE IN COMBINATION with Revere
NO. 4200 ENCLOSED FLOODLIGHT
OR NO. 3800 ELIPTOR OPEN-TYPE FLOODLIGHT
FOR FURTHER COLOR CORRECTION

ARIZONA COURT RULES ON CONNECTION FEE

Arizona's Supreme Court has ruled that a municipal corporation is exempt from the law prohibiting public utility corporations from making a charge for utility connections.

The ruling was issued in a case involving the Salt River Valley Project Agricultural Improvement and Power District and the Rubenstein Corp., a construction company that built 500 homes at Williams Air Force Base near Chandler.

The district provided power for the residences, charging a connection fee of $25 per unit.

The construction company sued to recover the money on grounds utilities are prohibited from levying such a charge. The court decision asserted municipal corporations may engage in the utility business without becoming public service corporations.

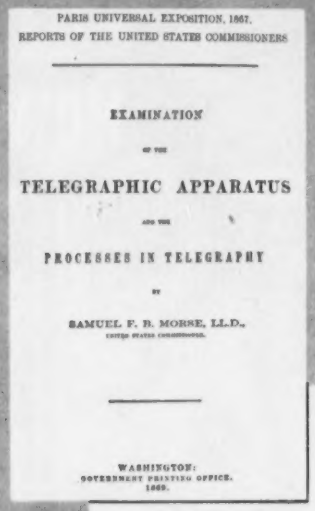
Judge Dismisses Suit Involving Surcharges

Circuit Judge C. F. Skipworth of Lane County, Ore., has dismissed for lack of jurisdiction a suit against Mountain States Power Co. brought by customers complaining of last winter's billing surcharges. The surcharges, approved by the Oregon PUC, were to recover a part of abnormal steam generation costs during the hydro shortage.

Similar suits have been filed against Portland General Electric and Pacific Power & Light in Multnomah County.

• **Shields & Co.** of New York headed a syndicate that bid successfully on $5,000,000 bond issue by the Salt River Power District of central Arizona. The firm bought the bonds at 3.495% average interest cost to the district plus a premium of $5,800. The syndicate included Coffin and Burr, Roosevelt and Cross, Eastman, Dillon and Co., Ira Haupt and Co., and Henry Dahlberg and Co., all of New York City. Five syndicates bid for the bonds—a record in district offerings. The money will be used for construction of the second unit of the Kyrene steam plant. The unit already is under construction and will go on the line by June.

• **New Mexico Public Service Commission** has taken under advisement a request by the Columbia Electrical Cooperative Inc. of Columbus, N. M., to buy the Nelson-Milburn Electric Co. of Hachita in Grant County. Proposed purchase price is $36,000.


PARIS UNIVERSAL EXPOSITION, 1867.
REPORTS OF THE UNITED STATES COMMISSIONERS

EXAMINATION

TELEGRAPHIC APPARATUS

PROCESSES IN TELEGRAPHY

SAMUEL F. B. MORSE, LL.D.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1869.

KERITE'S 100th Anniversary

1854—1954

Read what Professor B. Silliman of Yale University reported on the Kerite insulation exhibited at the Paris Universal Exposition of 1867.

TELEGRAPHIC APPARATUS, ETC.

DAY'S KERITE INSULATOR.

The kerite compounds of Austin Goodyear Day, mentioned in the following memoir, were honored by two medals and an honorable mention by the jury of the Exposition Universelle, to whom the subject was referred. These awards covered other products than the electrical cables and insulators which are the special object of the descriptive memoir.

NOTE UPON INSULATION AND KERITE, BY PROFESSOR SILLIMAN.

The exhibition of the kerite, this product of the persevering labors and experiments of Mr. Day for so many years, furnishes an example of the not infrequent inappreciation, or rather overlooking, of an invaluable discovery, when modestly presented, as in this case, among the more showy articles by which it was surrounded.

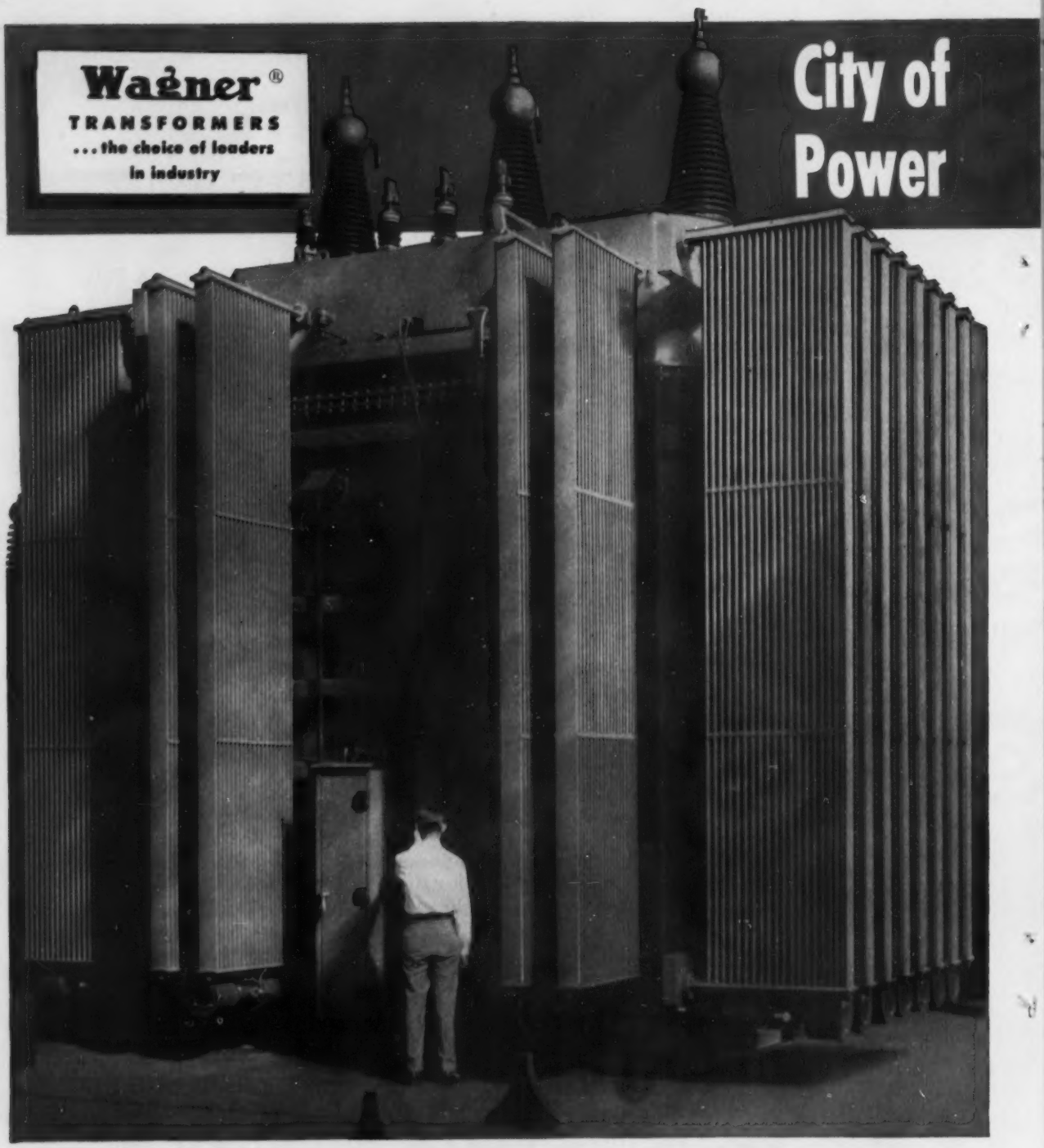
True, it received honorable mention as "artificial India-rubber," and a bronze medal for its very limited application to "India-rubber cases;" but its superlative value as a substitute in insulation for India-rubber and gutta-percha was not, for it could scarcely be, appreciated, presented as it was simply in one of its more ordinary applications; so that heedless neglect is not charged upon the jury, but it is mentioned rather as an example of the existence of an unnoticed quality in an apparently trifling discovery, necessarily latent to superficial inquiry; a quality which is destined in this case to have a most important bearing upon submarine and subterranean telegraphy.

The kerite, in its condition simply as artificial ... ssed under

The value and service life of a product can be no greater than the integrity and craftsmanship of its maker.

KERITE CABLE

THE KERITE COMPANY—30 Church St., New York 7, N. Y.
Offices also at 122 S. Michigan Ave., Chicago; 582 Market St., San Francisco;
3901 San Fernando Rd., Glendale 4, Calif.; 31 St. James Ave., Boston



This Wagner Power Transformer is one of two installed in Tacoma, Washington. Each is rated 30,000/37,500/50,000 kva, class OA/FA/FA three-phase, 60 cycle, 105000Y to 13,800 volts.

Wagner Electric Corporation
EST. 1891

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

T34-4

Tacoma installs two new Wagner Transformers to supply growing loads

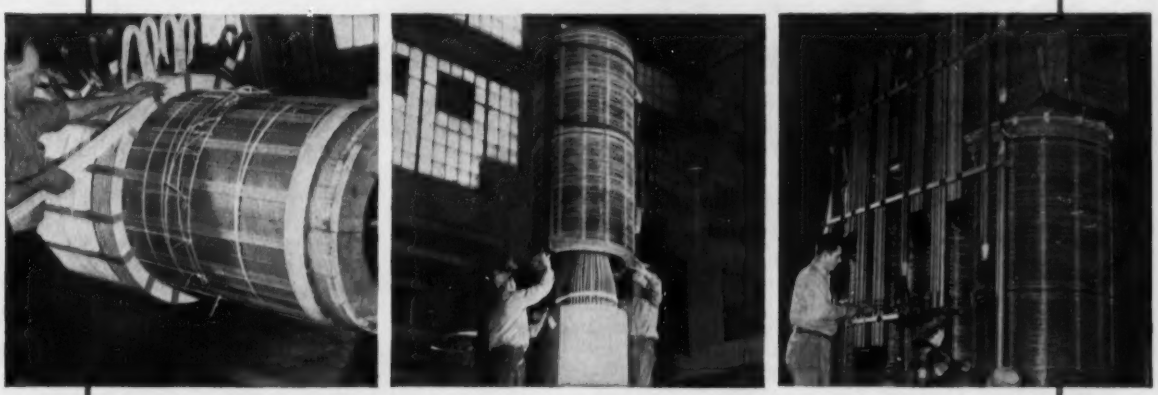
The Tacoma, Washington, Department of Public Utilities has recently installed two new Wagner Power Transformers each rated 30,000/37,500/50,000 kva, class OA/FA/FA, as part of an expansion program to help supply its constantly growing power load.

Wagner Transformers were chosen by the City of Tacoma, as they are by many power companies, because of their reputation for adequate and reliable service.

Wagner has been building power transformers for more than sixty years. The knowledge gained and the facilities acquired in all those years make the building of fine power transformers part of the day's work at Wagner.

Years of engineering "know-how"—Wagner's insistence on the use of only the highest quality materials—carefully controlled production methods—rigid inspections and tests all combine to assure users power transformers that will provide utmost reliability and service continuity.

Wagner's newly increased facilities now permit the manufacture of power transformers in ratings to meet your needs. It will pay you to consult Wagner on your next power transformer installation.



Every step in the construction of Wagner Power Transformers receives special attention. Three operations are shown above. Highly skilled workers wind a low voltage coil, carefully place a high voltage stack into position, and make the final connections on a core and coil assembly.

Thirty-two branch offices, located in principal cities, are at your service. Bulletins TU-180 and TU-181 give information on the complete line of dependable Wagner Transformers.

WAGNER ELECTRIC CORPORATION

6381 Plymouth Ave. • St. Louis 14, Mo., U. S. A.

BRANCHES IN 32 PRINCIPAL CITIES

BE Sure with CORNISH heavy duty extension cord sets

for Lawn Mowers, Hedge Trimmers, Portable Tools, Washing Machines, Refrigerators, Fans, Business Machines, Small Motors

CAT.	LENGTH	CORD TYPE
3543	15 ft.	16/2 16/3SJ
3544	25 ft.	16/2 16/3SJ
3545	50 ft.	16/2 16/3SJ
3546	75 ft.	16/2 16/3SJ
3547	80 ft.	16/2 16/3SJ
3548	100 ft.	16/2 16/3SJ

Individually cartoned—Packed 20 to Standard Shipping Package

Push these rugged service units! Husky black rubber cords in standard lengths; integral molded-on components. Female connector has double contact blades, insuring perfect connection. Moisture-proof . . . strain-proof . . . Real GLUTTONS for PUNISHMENT! Data sheets on request.

industrial extension cord sets

ALL-RUBBER components built to withstand crushing loads and impacts. Integral molded-on male and female components, waterproof and strain-resistant. Unequalled as power extension units in factories, shipyards and plants requiring 2-wire service. 25-, 50- and 100-ft. lengths; 16/2, 14/2 and 12/2, type S cord. Data sheets on request.

electric range cord sets

3-, 4-, 5- and 6-ft., type SR rubber covered range cable. Two #6 and one #8 conductors for 50 amp., or two #8 and one #10 conductors for 35 amp. service. CORNISH #500 molded-on plug vulcanized to cable for long-time water-repellent security. Equipped with suitable terminals and metal strain relief. Each cord individually boxed.

Data sheets on request

Support your local Adequate Wiring Bureau program

CORNISH WIRE COMPANY, INC.
50 Church Street New York 7, N. Y.

the Emblem of Quality since 1875

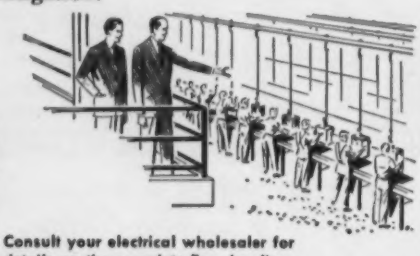
FARADAY

SIGNALS and SYSTEMS ADD SPEED . . . SAFETY

Properly designed and installed signals and systems are real time-savers that smooth out many a plant problem—help stop wasted motion. And solving individual signaling problems has been Faraday's business for *seventy-eight years.* These years of experience assure correct plans, correct installation. To be sure that your signaling system is operating at top efficiency, check with Faraday. No obligation.

NECK-TYPE BELLS

VIBRATING HORNS



Consult your electrical wholesaler for details on the complete Faraday line.

HOLTZER-CABOT FARADAY STANLEY & PATTERSON

CONSOLIDATED BY:

SPERTI FARADAY INC. ADRIAN, MICH.

BELLS · BUZZERS · HORNS · CHIMES · VISUAL AND AUDIBLE PAGING DEVICES AND SYSTEMS

DISTRICTS GET GO AHEAD ON CONDEMNATION CASES

Stevens County (Wash.) PUD has again won the right to condemn properties of Washington Water Power Co.

A superior court judge last month approved a certificate of necessity in favor of the PUD. Attorneys for the district and Washington Water Power stipulated that no hearing would be held before December 1954 to determine the valuation of WWP properties in the county.

In 1948 Stevens PUD won a similar court award, but abandoned its condemnation program when it could not raise the $2,500,000 that a jury set as the value of WWP properties.

Chelan County PUD's condemnation proceeding against WWP is ready for jury trial to determine value of Chelan Dam and power plant.

The State Supreme Court denied the company a rehearing on its plea that the PUD's certificate of public use and necessity be modified to omit the section that allowed the district to condemn the dam.

WWP had contended that the condemnation was no longer justified because, since instituting its suit in November 1948, the PUD had installed generating facilities at Rock Island Dam sufficient for its needs.

Public Power Groups Form State Operating Agency

Public Power forces from a score of Washington PUDs and municipal systems have joined in organizing Washing State Operating Agency No. 1, the first such partnership for generating and distributing power.

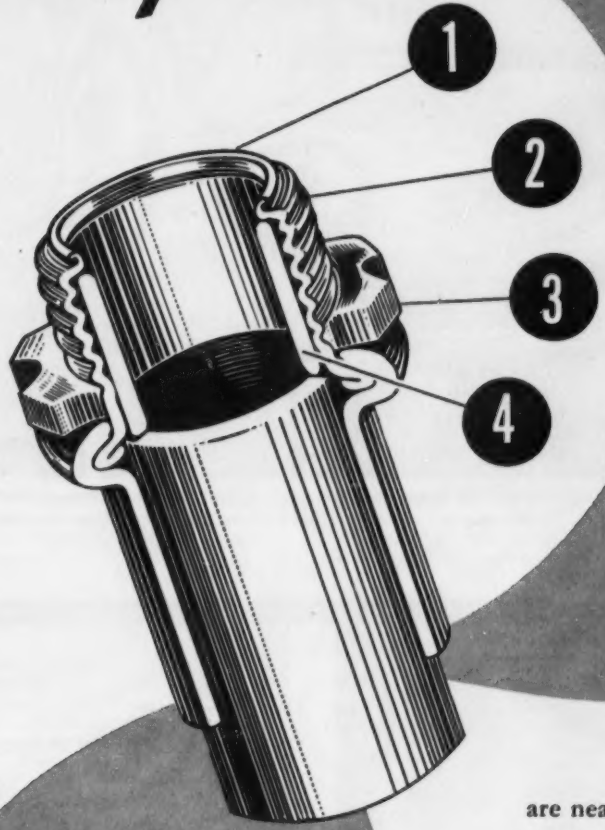
Representatives of 23 public power systems in the state attended a one-day organizational meeting in Seattle, Wash., on Jan. 7.

All but four of the public utilities indicated readiness to sign a petition seeking formal approval of the operating agency by the new Washington State Power Commission. Two of the four said they would join the agency as soon as the necessary board meetings are held. The agency seeks broad authority to build power dams, transmission lines and distribution systems.

• **Chehalis, Wash.,** City Commission is considering an ordinance that would boost its tax on Lewis County PUD bills from 3 to 5%, raising an additional $7,200 annually. The PUD has objected, declaring increased taxes defeat the PUD's purpose of providing low-priced power.

New B-M 21 E Connector

HAS 4 OUTSTANDING FEATURES



1 Smooth Rolled Edge Throat will not cut or scrape plastic insulation.

2 Full thread screws into all conduit fittings.

3 Nut screws down flush to shoulder for positive ground.

4 Internal sleeve same inside diameter as tubing insures smooth raceway for easy fishing.

All B-M Indenter Fittings are U. L. approved as Concretetight and for General Use. (File Card E 10863)

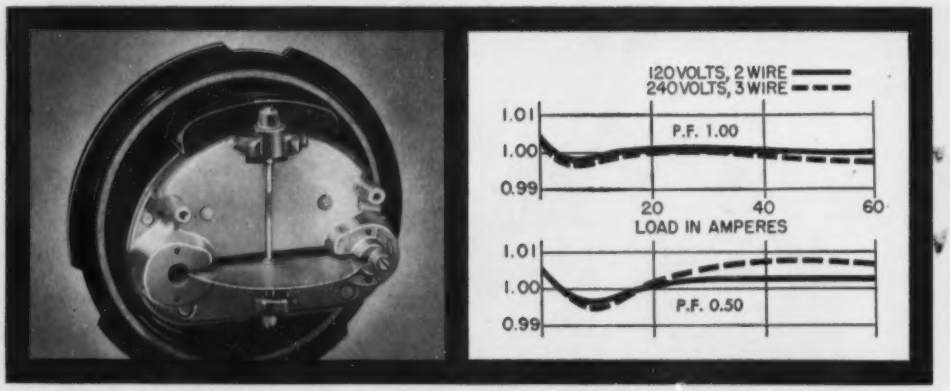
Briegel, the Original Indenter Fittings are neater in appearance, easier and faster to use. Installation is simple and less expensive. Two quick squeezes sets them forever. Try B-M Indenter Fittings and get more profits from each job!

BRIEGEL METHOD TOOL CO.
GALVA, • ILLINOIS

NEW

General Electric Type I-50 universal 2-wire / 3-wire watthour meter

NEWEST MEMBER of the General Electric I-50 family, the universal I-50 meter is two-meters-in-one, both 2-wire and 3-wire. It can be quickly converted *in the field* from 120-volt to 240-volt service with only a screwdriver. Total conversion time: about *one minute.*



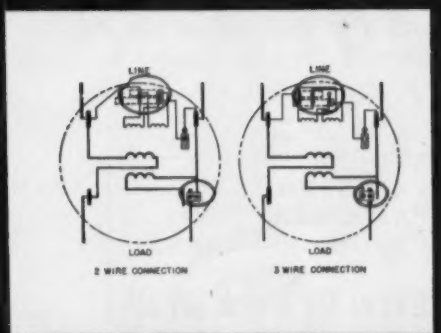
3 **IMPROVED DESIGN** of the new universal I-50 watthour meter permits conversion with a minimum change in calibration; normally eliminates any need for recalibration.

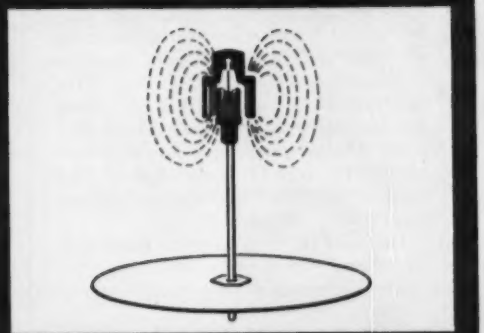
4 **STRAIGHT-LINE ACCURACY** up to 60 amperes for both 120- and 240-volt service results in longer meter life and lower maintenance costs.

✱ **GENERAL ELECTRIC TYPE I-50 UNIVERSAL 2-WIRE/3-WIRE WATTHOUR METER** is the newest member of the I-50 family. For a sample demonstration, or for more information, contact your nearest G-E representative, or write: Section 601-102, General Electric, Schenectady 5, New York.

Another new member of the I-50 family

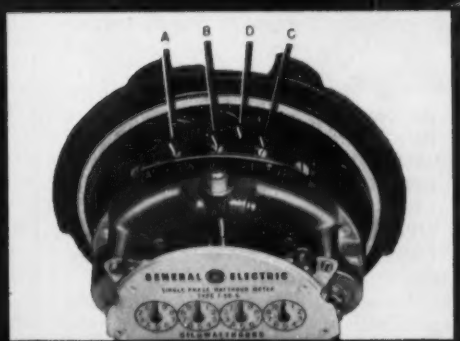
5 REASONS WHY THIS NEW G-E METER* WILL LOWER YOUR METERING COSTS





1 **NEW UNIVERSAL** I-50 meter, shown connected for 2- and 3-wire operation, incorporates many cost-saving features of the 15-amp I-50.

2 **MAGNETIC SUSPENSION SYSTEM,** with the "floating disc," inherent high accuracy, co-ordinated insulation all mean lower maintenance and operating costs.



5 **CONVERT IN A MINUTE.** Here's how conversion is done in the field from 2- to 3-wire with only a screwdriver, quickly and easily: **POTENTIAL-CIRCUIT** conversion: Snap off terminal-board cover; loosen screws A, B, C and move terminal board D from position BC to position AB; tighten screws A, B, C; replace cover. **CURRENT-CIRCUIT** conversion: Loosen two screws on current winding adapter; swing connector from position E to F; tighten screws; remove rating tab.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

It's smart to specify Efcor

ELECTRICAL FITTINGS

because they are:

★ Made of Malleable Iron and Steel

★ Engineered for improved performance

★ A complete line of fittings for every type of job

UL

Efcor MAKES "THE BEST CONNECTIONS"

SOLD THROUGH ELECTRICAL WHOLESALERS ONLY

Efcor ELECTRICAL FITTINGS CORP.
Dept. W-15
Woodside 77, New York

ARIZONA RUNOFF IS NEAR RECORD LOW

It has been another dry year for Arizona. Near-record lows in stream runoff have left the rangeland parched and officials of water-user organizations in the Salt River Valley portion of central Arizona have given up hope of filling the reservoir system this year.

Reservoir levels still are adequate to carry the valley through another dry year. This supply, plus the Valley pumping system, and an estimated replacement of 220,000 acre-ft in surface reservoirs would take care of the situation and leave water for next year, if the runoff again drops off.

Water users, however, are concerned about a possible prolonged period of drought.

In the 220,000-acre Salt River Valley Water Users Assn. system—fed by the Salt and Verde Rivers—storage the first week of December was 970,000 acre-ft. This is still 70% above the 44-year average. Lake Mead and Lake Mohave storage facilities had 18,960,000 acre-ft at the end of December, which is 310,000 acre-ft above the 18-year average.

In southern Arizona, however, rivers and creeks were dry.

New Colorado Diversion Plan Studied in Arizona

Arizona is studying a cheaper way to divert Colorado River water 200 miles to its parched central valleys. It thinks the $788,000,000 cost under the Central Arizona Project can be pruned, according to Gov. Howard Pyle.

One of the main objections to the project in the past has been that more than a third of the power generated at Bridge Canyon Dam, to be constructed at the head of Lake Mead, would be required for a 920-ft pump lift out of Lake Havasu, below Hoover Dam, to provide the initial head for delivery to central Arizona.

Now it is indicated other pumping possibilities would eliminate need for the costly operation. Steam-generated power, or possibly atomic power, could do the job far cheaper, project backers claim.

Actually Arizona has little time in which to work out some solution if it hopes to achieve its project plan. Under the Colorado River Compact water not put to use by 1963 will be up for reallocation.

Under U. S. Supreme Court consideration is a suit over conflict on interpretation of just what the original Colorado River Compact means. Any delay in this suit on water rights and use curtails Arizona's time for preparation of future project consideration.

California is Arizona's chief opponent on the project. Twice Arizona gained U. S. Senate approval but each time was defeated in the House.

Most of the campaign against the project has been based on cost. Arizona estimates for the project have ranged from $588,000,000 when proposed in 1946 to an inflated $788,000,000 now. Opponents claim it will cost $2 billion.

• **Colorado Central Power Co.**, serving Denver suburbs, has started paying dividends on a monthly basis. President James W. Cryder said the first dividend of 10c a share was paid Jan. 2 to stock of record Dec. 17. The company paid dividends of 25c a quarter in 1953 and 25c a quarter in 1952.

LIGHTER!
SMALLER!
MORE EFFICIENT!

★

PENNSYLVANIA

POLE STAR

TRANSFORMERS

now available in every distribution size

3 through 500 kva
480 volts through 67,000 volts

In new installations or replacements, Pole Star Transformers are ideally suited to today's distribution needs. They are smaller, lighter, more efficient . . . embodying a patented lapped core that takes full advantage of the outstanding flux-carrying capacity of cold-reduced, oriented electrical steel.

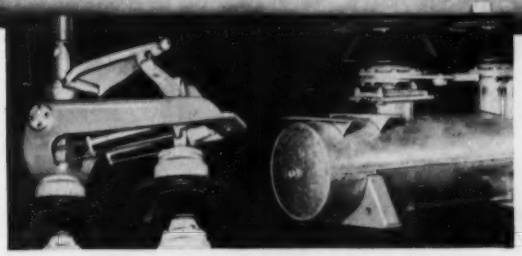
J. G. CORRIN
600 S. Highland Avenue, Los Angeles
VAndike 5533

GEO E. HONN CO.
420 Market Street, San Francisco
SUtter 1-7252

. . . for the Highest Basic Insulation Level Commercially Used in the United States

PACIFIC ELECTRIC AIR SWITCHES
of 1300-kv or 1525-kv (pictured) B.I.L.
for Operation to 330 kv — 1200 and 1600 amp.
(Other styles, 7.5 kv and up)

Full-Floating Jumperless Hinge Contacts
(Sectional view)
Arrows show current path



At left:
Simplified Three-Link Blade Operator

At right:
Cylindrical Anti-Torsion Steel Base

THE PACIFIC Electric Type TG-4 Vertical-Break Air Switch shown in the illustration is a single-pole unit of an order recently completed for a large Western utility. Rated at 1200 amp, 1525-kv Basic Insulation Level, the switch is for operation at 287.5 kv or 330 kv.

Similar switches of 1300-kv Basic Insulation Level—also for operation at 330 kv, as is the practice on some systems—have one less insulator per stack.

The problem of stack rigidity of the insulators—increasingly serious as stack heights mount—is solved by use of a cylindrical base. Its section is ideally adapted to the torsional loading from rotary-insulator operation and from side winds.

OTHER FEATURES, which also apply to all Type TG switches, 115 kv and up

- Solid-silver inserts at opening-end and hinge-end contacts.
- Sealed weatherproof housing encloses full-floating hinge-end contacts. Flexible jumpers are not used.
- Twin counterbalance springs in weatherproof housings assure easy operation at all positions of stroke.
- Roller, ball, and oilite bearings, hardened and ground stainless-steel pins, precision machining, and generous proportioning of parts characterize the mechanical design.

. . . Write for Catalog No. 129 for further information

Since 1906

SALES OFFICES or AGENCIES
in PRINCIPAL CITIES

PACIFIC ELECTRIC • MFG. CORPORATION •

SUBSIDIARY OF FEDERAL ELECTRIC PRODUCTS COMPANY

5815 THIRD STREET, SAN FRANCISCO 24, CALIFORNIA
OTHER FACTORIES: SANTA CLARA, CALIF.; SCRANTON, PENNA.

NEW FINANCING PLAN SUGGESTED TO STATE

A proposal that the State of California finance the $1,200,000 Feather River project through general obligation rather than revenue bonds has been made by California's Gov. Goodwin J. Knight.

A law already is on the statute books to permit the issuance of revenue bonds. A general obligation bond issue would require a favorable two-thirds vote at a state-wide election.

In a talk at an Oroville Chamber of Commerce meeting, Knight admitted approval by the state's voters "might be difficult to get." But, he said, the state bonds could be obtained at much lower interest rates than straight revenue bonds, purchased from investment bankers.

The governor emphasized interest rates on the project assume great importance "because the more interest we have to pay, the more we will have to charge for the water and power furnished by the project."

Knight made it clear he favors the project and noted "we may find it necessary to construct the major revenue producing portions first, building the rest as revenues accumulate."

"When our final studies are completed," the governor stated, "I believe we will be in a position to plan ultimate repayment of all reimbursable costs of construction, maintenance and operation entirely from the project's water and power revenues."

Irrigation District Plans Feather River Development

Plans of the Richvale Irrigation District for a $90,000,000 water and power development on California's Middle Feather River were filed last month with the State Division of Water Resources.

Filing the plans with the state bureau is a necessary step in establishing water rights for the project. Glen R. Harris, director of the district, said parallel action is being taken to secure authorization from the Federal Power Commission for use of federal lands affected.

The irrigation district plans to construct six dams affording 250,000 acre-ft of storage, 23 miles of tunnel and five hydroelectric power stations with installed capacity of 258,000 hp. Water is needed to supplement the present supply for irrigating the area's rice fields, biggest in the state. The power will be sold.

Richvale would coordinate its development with the State Water Board's proposed $1,200,000 Feather River project, which would involve construction of a dam and power plant near Oroville, building of canals, pumping plants and other facilities to carry the water into southern California. Oroville Dam would be lower on the stream than the Richvale project.

Seattle Opposed in Plan To Build Boundry Dam

Seattle City Light's proposal to build a dam on the Pend Oreille River at the Boundary site has met opposition in the Northwest.

Joining the Northwest Mining Assn. in protesting immediate construction of the dam, the Spokane Chamber of Commerce sent FPC a resolution urging delay until mining resources have been depleted.

Pend Oreille County PUD of Newport, Wash., asked the commission to deny the application on grounds that a Boundary Dam would completely overflow and destroy the Z Canyon site, which the district has purchased for development after it completes its Box Canyon Dam.

Two lead-zinc mining firms whose properties would be flooded also have protested the dam.

Delay Seen on B. C. Power Development on Quesnel

Delay of at least another year appears inevitable in connection with the electric power development on the Quesnel River in British Columbia. Towards the end of 1953 the government intimated that construction would be started in 1954, and that the government proposed to spend $9,000,000 on the 40,000 hp on the north fork of the Quesnel River.

Reports now indicate that the B. C. Power Commission have declined to proceed with the development of this site because the cost per horsepower would be too high.

The cost of the north fork development is estimated at at least $214 per horsepower, compared with $130 per horsepower at the John Hart development and at Campbell River.

The commission is now investigating the Clearwater River, a tributary of the Thompson River, which is said to have a potential of at least 75,000 hp. This power development would involve a much larger transmission distance to the central interior of B. C. than the Quesnel development, but this cost would be offset by the cheaper power site.

EUGENE BRINGS SUIT TO ACQUIRE PRIVATE SYSTEM

Eugene, Ore., Water & Electric Board has filed condemnation suit to acquire Mountain States Power Co. properties laying between two of the municipal systems' service districts and at the same time has laid out a multimillion dollar hydroelectric development program for the Upper McKenzie River.

The condemnation suit was not unexpected. The city has been negotiating with Mountain States over a period of years for the properties and last July started building competing distribution lines in the two suburban districts. It has offered $1,350,000 for facilities in the Willakenzie and Glenwood areas serving about 2,200 customers and believed to represent about 50 miles of primary distribution lines plus secondary and service lines involved.

In reporting plans for development of the Upper McKenzie, the municipal board said its long-range studies involved intent to spend about $6,500,000 to develop 30,000 kw of capacity at Beaver Marsh site and, in partnership with the federal government, to develop 28,000 kw (at a cost to the utility of about $11,000,000) on the Cougar project of the South Fork of the river.

The Beaver Marsh project would be undertaken first. Located some 57 miles from Eugene, the site could be developed and power produced by the fall of 1957, it is reported.

Cougar Dam project, part of the Willamette basin flood control development, has been authorized by Congress for flood control phases only. In recent months Cougar and Green Peter Dams have been suggested by various Oregon groups as the next to be constructed and Oregon congressmen have been pledged to work for congressional sanction of hydro installations, presumably by a nonfederal agency.

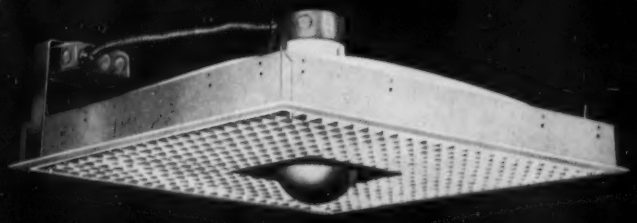
A Blyth & Co. representative told the board the Cougar might cost more than it is worth on a per kilowatt basis but James C. Howland of the Corvallis engineering firm is reported as calling the Cougar the most feasible project wtihin the Eugene board's territory. Assuming quick approval by Congress, it is figured that Cougar might be supplying power by 1960.

• **Public Service Co. of Colorado** has placed in service a new 10,000-kw addition to its Alamosa steam plant. This raises the capacity to 20,000 kw. A 10,000-kw installation was finished in the summer of 1949 to replace an old plant.

another

SMOOT-HOLMAN

FIRST



The Smoot-Holman Silvray Skylike flush type recessed unit is now completely wired and pre-assembled at the factory with full UNDERWRITERS APPROVAL. These new features greatly simplify installation procedure, resulting in savings in time and money. Skylike utilizes the Silvered Bowl incandescent lamp, sizes 150W/500W, and its contemporary design with baked white enamel finish, harmonizes with every ceiling. For quality and economy, install SMOOT-HOLMAN pre-assembled Skylike units—single or multiple.

look to..... SMOOT-HOLMAN .....for quality

ILLUMINATION EQUIPMENT • INGLEWOOD, CALIFORNIA

Sales Offices in Most Principal Cities • Branch Office and Warehouse, San Francisco

EXTRA Holding Power
QUICKLY Installed
TOUGH For long life

EVERSTICK ANCHORS

For new construction and maintenance —Everstick Anchors speed up work and provide dependable anchorage on all types of jobs. Made of resilient, rust resistant malleable iron. The toughest anchors made. Write for bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

Dry Type Distribution
TRANSFORMERS
All Sizes through 500 KVA

Illustrated is Floor Mounting Type CF with Removable Plates, 100 through 300 Kva. Also available in Sizes 45 through 75 Kva.

BURTON

Built to ASA and NEMA Standards

Burton Transformers are meeting the most severe tests with dependable, trouble-free service.

Burton Equipment Co., Inc.
4810 Firestone Blvd.
South Gate, Calif. LOgan 8-3151

EQUIPMENT CONTRACT AWARDED BY ARMY

Westinghouse was awarded a $771,-346 contract for three automatic transformers and services of an erection engineer for The Dalles power plant. The bid was 38% higher than that of a foreign firm and the contract provides an escalator clause for increases up to 20%.

American Elin Corp., New York, with a factory in Weiz, British zone of Austria, bid $558,600 with no escalator clause. Second low bid was by English Export & Trading Co., $634,-890.

Under the law 25% is added to foreign bids before comparison with offers of domestic firms. Foreign bids also include import duties.

Nevada Senator Questions McNary Contract Award

Army Engineers awarded contract for generators 13 and 14 at McNary Dam on the Columbia River to English Electric Export & Trading Co. Ltd. on a bid of $3,651,461. According to Col. Fremont S. Tandy, Walla Walla district engineer, the British firm's bid was approximately $200,000 below the nearest American figure.

Senator George W. Malone (R-Nev.) in a speech prepared for Senate delivery called on the Army and Defense Department to suspend the contract pending answers to five questions regarding the economic and military interest of the United States.

• **Guy Atkinson and Ostrander** Construction companies were low bidders for phase three of The Dalles power house, with an offer of $18,886,006. Government estimate on the work was $20,056,581.

• **Bids** for an 84-in. welded-steel penstock 509 ft long, part of a $1,500,-000 hydroelectric plant expansion, were called by the Centralia, Wash., City Commission for opening Jan. 19. The penstock will extend between the city's existing gate house at the forebay and a proposed power house on the Nisqually River near Yelm, serving a new 6,250-kva generating unit. Water from the river will flow about nine miles through a dug canal to the forebay.

• **British Thomson-Houston Export** Co. of Montreal, Canada, submitted a low bid of $208,000 to the city purchasing agent at Seattle for four circuit breakers needed by the City Light department.

MICA?
—Whatever you want, we have it!

- Y-26 HIGH HEAT MICA PLATE Composite bonded, for heater appliances. Sheets or stampings.
- SUPER-NEMCOITE Composite bonded for equipment or machinery. Flexible or rigid sheet, tubing, or combined with Fiberglas.
- MICA COMMUTATOR INSULATION Rings, Segments, Sleeves to specifications.
- MICA MOLDING PLATE (Thermoplastic) Sheets, stampings or molded forms.
- MICA SEGMENT PLATE (Thermoset) Sheets, stampings or molded forms.
- FLEXIBLE MICA PLATE (Cold Forming) Sheets, or combined with Fiberglas, paper, cloth.
- MICA TUBING Any diameter and wall thickness, or sleeves and bushings.
- MICA TAPE Any thickness or width, combined with paper, silk, rayon, cellophane, Fiberglas.

Your Complete Source for Mica!
NEW ENGLAND MICA
Waltham, Mass.
Standard Forms in Stock Ready To Ship From
INSULATION and WIRES
INCORPORATED
LOS ANGELES 2240 E. Washington Blvd.
PORTLAND, ORE. 1702 N. E. Sandy Blvd.
SAN FRANCISCO 1077 Howard St.
ST. LOUIS And 12 other cities

LINCOLN CHAMPION B-LINE ALKO MEET WILSON ... GERINGER SUPREME

LIGHTING PROBLEMS
JUST ASK FOR
PANAMA LAMP & COMMERCIAL CO., INC.
for better lighting—it's PANAMA
325 Ninth Street, San Francisco 3, Calif.
Phone: MArket 1-3251
57 years of LIGHTING Service

BRASS AND COPPER TUBE MILL
New Brunswick, New Jersey
PLASTIC PIPE PLANT
New Brunswick, New Jersey
CONDUIT PLANT
Moundsville, West Virginia
WIRE AND CABLE PLANT
New Brunswick, New Jersey
In 1916, we manufactured two products in a little Brooklyn plant. Today, we operate four large factories making a huge variety of products.

How Does A Company Grow?

A company grows not alone because of the quality of its products. We, at Triangle, are well aware that success depends on something more. Success depends on our attitude towards people — customers and prospects — people like you.

That's why, at Triangle, you get, *in addition to* top quality products —

THE HUMAN TOUCH

FRIENDSHIP **LOYALTY**

HONESTY **EXTRAORDINARY SERVICE**

Those are our roots. Those are the reasons why we grew.

TRIANGLE CONDUIT & CABLE CO., INC.

New Brunswick, New Jersey

Manufacturers of arteries for electricity, liquids and gases

WIRE • CABLE • CONDUIT • PLASTIC PIPE • BRASS AND COPPER TUBE

PLANTS: NEW BRUNSWICK, NEW JERSEY

WIRE AND CABLE PLANT • ROD MILL • BRASS AND COPPER TUBE MILL
PLASTIC PIPE PLANT

MOUNDSVILLE, WEST VIRGINIA: CONDUIT PLANT

The Trade Mark of TOP Quality

TRIANGLE

IT MUST BE RIGHT! ®

CITIES, CO-OPS PROMISED PUBLIC POWER IN 1954

Sufficient public power will be available in 1954 to meet all the demands of 25 cities and 39 rural electric cooperatives in Colorado, Wyoming and Nebraska.

Harold Lee, chief of the power division of Region 7 of the Bureau of Reclamation, said there should be some power left over even for industrial users and private utilities.

Lee said negotiations will begin in March on the applications filed by the 25 cities and 39 co-ops before the Jan. 1 deadline. Applications are for contracts for periods ranging from 2 to 20 years. Lee said no preference customer had failed to file an application.

He reported public power sales in Region 7 will top $4,000,000 for the first time in 1954 and may even reach $4,500,000. The sales in 1953 totaled $3,970,820.

Lee said at his Denver headquarters that the applications have been sent to the Interior Department in Washington, D. C., for final review.

The addition of 170,000 kw to the region's public power output early in 1954 will raise the total available to 250,000 kw, Lee said.

California Utility Asks Electric Rate Increase

California Electric Power Co. has filed an application with the California Public Utilities Commission asking for a 9.18% rate increase to become effective at the earliest possible date.

The utility stated that it requires a 6¼% rate of return under normal water conditions at hydroelectric dams. If granted, the increase will add $1,330,900 to annual gross revenue.

During the 12 months ended Sept. 30, 1953, the utility reported its earnings were not over 5.89% on its depreciated rate base with normalized water supplies.

Seattle Signs 20-Year Bonneville Contract

City of Seattle has accepted a 20-year contract between City Light and the Bonneville Power Administration. Already approved by Department of the Interior, it replaces a five-year contract expiring in 1957.

E. R. Hoffman, in one of his last acts as City Light superintendent, submitted the revised draft to the council's utilities committee, which recommended approval.

Several changes were made from the original draft. Anticipating the possibility that the federal agency might some day be unable to meet full requirements of City Light and other public bodies, Seattle secured inclusion of a requirement that Bonneville give five years' notice of intention to apply a provision that, in event of a shortage, all public agencies be held to supplies they received the previous year.

In the revised contract, only new loads of 10,000 kw or more would require BPA approval. The original contract called for approval on new loads above 5,000 kw.

• **California Committee** on the Relation of Electricity to Agriculture was to sponsor its 26th annual rural electric conference at the University of California, Davis, Feb. 8 and 9. New equipment and methods were on the program and scientists and industry leaders were speakers. The conference was to be conducted by the department of agricultural engineering of the College of Agriculture, with James B. Tavernetti, agricultural engineer, in charge of arrangements.

• **A second application** has been made to the Federal Power Commission for a permit to make preliminary engineering studies of the Wells Dam site on the Columbia River 51 miles upstream from Wenatchee, Wash. The new applicant is the Douglas County PUD of Bridgeport, near the dam site. Puget Sound Power & Light Co. last month applied for permission to develop the site.

• **New Mexico** Public Service Commission has approved a new tariff designed to carry out a $312,000 rate increase recently granted to the Public Service Co. of New Mexico. The PSC said the new rates mean the average residential customer in the Albuquerque area will pay about 50c more a month for electricity. Las Vegas customers will get a slight reduction and Santa Fe rates remain almost unchanged. It explained this is because the rates in the latter two cities have been higher than basic rates in Albuquerque.

• **The Crow Indian tribe** on the Crow reservation near Billings, Mont., Dec. 30 turned down for the second time an offer of $1,500,000 for land on the site of the proposed Yellowtail Dam on the Big Horn River. The tribal council also voted to oppose the dam under any circumstances. The offer was for 6,000 acres.

FIVE WESTERN COMPANIES WIN MANAGEMENT AWARDS

Five Western utilities were among 30 in the United States to be certified as "excellently managed" by the American Institute of Management, New York. Pacific Gas and Electric Co. won the award for the fourth consecutive year and Southern California Edison Co. was a second-time winner. Companies receiving the designation for the the first time included Idaho Power, Montana Power and Pacific Power & Light.

The institute uses a point system for rating 10 key factors—economic function, corporate structure, health of earnings growth, fairness to stockholders, directorate analysis, research and development, fiscal policies, production efficiency, sales vigor and executive evaluation.

Extension Courses Are Offered To Engineers

Beginning in mid-February, Engineering Extension at the University of California is offering a number of courses of interest to electrical engineers. Classes may be organized on an in-plant or contract basis or for interested public groups anywhere in California.

New this year are Power Transformers, an advanced course in theory, operation and application of transformers used in power systems, and Communications Theory, elements of statistical studies of communications systems.

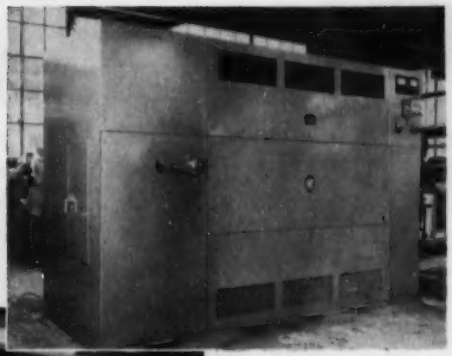
Returning to the curriculum are the following courses: Industrial Electronics; Industrial Instrumentation and Automatic Control; Electrical Construction Practices; Industrial Motor Control; Review of Electrical Engineering.

Colorado Power Starts Steam Plant Addition

Work will start in February on a $3,000,000 addition to the Southern Colorado Power Co. steam plant at Canon City. David B. Hyer Jr., president, announced the go ahead after Canon City voters approved, 685 to 6, a 20-year franchise for the company. The 16,500-kva unit will more than double the present capacity of the plant and its 7,500-kva turbine installed in 1917. The new plant will include a 163,000 lb-per-hour boiler, a 35-ton crane and a spreader-type stoker. All will be automatically controlled.

MARCUS dry type TRANSFORMERS

are insulated with NATVAR SPECIAL INSULATION



This trim, compact cabinet houses a Marcus 2000 kva., 4800-480 volt, 3 phase, 60 cycle, dry-type transformer which will supply intermediate AC power to a bank of selenium rectifiers in a large West Coast metal reduction plant.

This interior view shows the rugged construction of Marcus industrial unit substations. A Natvar special combination of Quinorgo® firmly bonded to varnished open-weave Fiberglas provides a flexible insulation of high dielectric strength and great mechanical toughness, plus the ability to withstand continuously high operating temperatures. It is used as a layer insulation for the major insulation barrier between primary and secondary, and between core and coils.

Marcus Transformer Co., Inc., Hillside, N. J. manufactures dry-type transformers from 1 to 3000 kva. capacity, engineered for long life and continuous, trouble-free service.

All materials used in their construction are carefully chosen for durability and performance under maximum loads at high temperatures. A Natvar special combination of Quinorgo® and Fiberglas firmly bonded together is used because of its exceptionally good electrical properties, flexibility, mechanical strength, and its ability to withstand heat.

Whether your requirements call for a standard insulating material, available either from your wholesaler's stock or direct from our own, or a special combination, it will pay you to investigate Natvar flexible insulations.

Natvar

Natvar Products

- Varnished cambric—cloth and tape
- Varnished canvas and duck
- Varnished silk and special rayon
- Varnished—Silicone coated Fiberglas
- Varnished papers—rope and kraft
- Slot cell combinations, Aboglas®
- Varnished-lacquered tubing and sleeving
- Extruded vinyl tubing and tape
- Styroflex® flexible polystyrene tape
- Extruded identification markers

Ask for Catalog No. 22

NATVAR CORPORATION

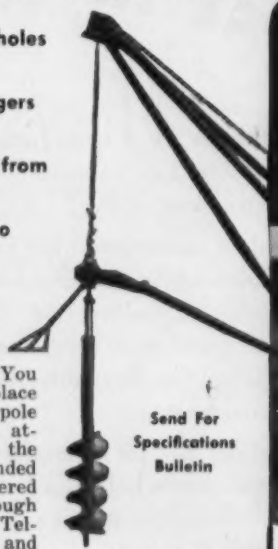
FORMERLY THE NATIONAL VARNISHED PRODUCTS CORPORATION

TELEPHONE RAHWAY 7-8800 — CABLE ADDRESS NATVAR: RAHWAY, N. J.

233 RANDOLPH AVENUE • WOODBRIDGE, NEW JERSEY

Operates ON ANY DERRICK TRUCK

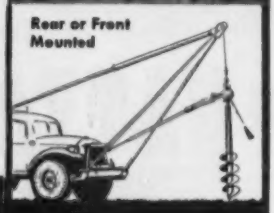
- Adjustable for clean holes to 10 ft. deep.
- Interchangeable augers 8" to 20" diameter
- Drills a straight hole from any truck position
- Easy to use—easy to transport



Send For Specifications Bulletin

TEL-E-LECT POLE HOLE DIGGER

Rear or Front Mounted



WITH the Tel-E-Lect Pole Hole Digger, you use the same truck and crew that sets the pole. You can drill a hole any place that you can spot the pole derrick. A single bolt attaches the digger to the truck, it works suspended from the derrick. Powered by the truck motor through a power take-off shaft, Tel-E-Lect digger is raised and lowered by the winch line. Fits the budget of even the smallest utility or contractor, and quickly pays for itself.

Distributed by:
Am. Equipment & Body Co., Los Angeles 33
Cole Comm. Co., 3423 4th Ave. S., Seattle, Wash.
Truck Equip. Co., 3963 Walnut St., Denver, Colo.
Utility Body Co., Oakland 7

TEL-E-LECT PRODUCTS, Inc.
10025 MINNETONKA BOULEVARD, MINNEAPOLIS 16, MINNESOTA

NEWS ABOUT PEOPLE

• **The Colorado Engineering Council** has voted the Gold Medal Award for "distinguished engineering service" to **Lawrence M. Robertson,** chief electrical engineer for Public Service Co. of Colorado. It is the sixth award voted by the council in the past 35 years. The council is made up of 23 member organizations, including the American Institute of Electrical Engineers, which sponsored Robertson for the award. Robertson began work for Public Service Co. in 1922 after graduation from the University of Colorado.

• **Herman F. Bahmeier,** USBR construction engineer in charge of Folsom power plant, Nimbus Dam and power plant and Sly Park project, has been lent to the government of Australia. He will help in the construction of the Snowy Mountains Hydro Electric project in New South Wales. Bahmeier started his engineering career 42 years ago in Australia. He spent four years as an irrigation engineer following his graduation from Colorado A and M College.

• **Joseph S. Thompson,** president and founder of Pacific Electric & Mfg. Co. and vice-president of Federal Electric Products Co., San Francisco, has been elected a trustee of the Henry George School of Social Science, New York.

• **Robert C. Herrick** has been assigned to Allis-Chalmers' Los Angeles district office as a sales representative. He had been assistant application engineer in the manufacturer's processing machinery department for several years.

• **I. M. Ellis** has been made West Coast regional manager for General Electric communication equipment at San Francisco. He succeeds **L. R. Sheeley,** who was transferred to Syracuse, N. Y., as manager of sales.

• **Percy W. Brown** has retired as treasurer of B. C. Electric, Vancouver, a position he has held since 1947. His successor is **William F. Martin,** formerly executive assistant to the vice-president and chief financial officer.

• **Claude L. Draper** of Wyoming has been re-elected vice-chairman of the Federal Power Commission to serve during the calendar year 1954.

• **Promotion** of **Kenneth W. Van Gundy,** former Shasta division commercial manager, to manager of the newly created San Mateo district has been announced by Pacific Gas and Electric Co. **Loren A. Woolf** has been transferred from Sacramento, where he was sales supervisor, to take over as Shasta commercial manager and will be stationed at Red Bluff, division headquarters.

• **Randolph O. McGougan,** editor of PG and E *Progress,* retired in January. He had been with PG and E since February 1929 and editor of the company's customer house organ for most of the years since.

• **Thomas W. Snell** retired from Pacific Gas and Electric Co. on Dec. 31, after 40 years of service. At the time of his retirement he was district manager at San Jose.

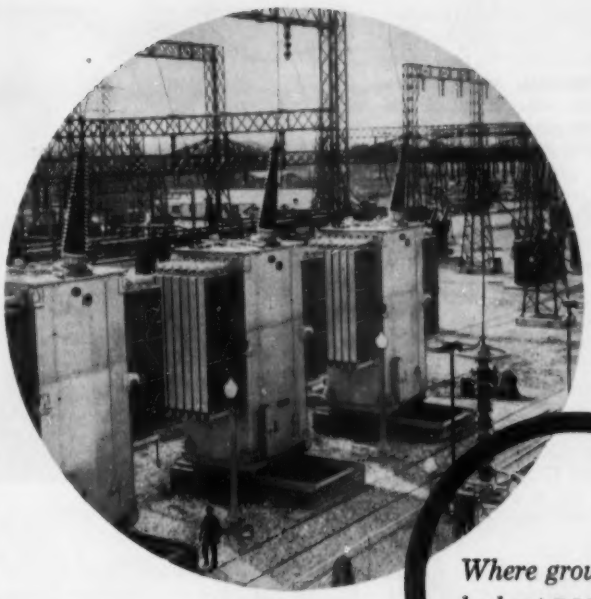
• Promotion of **Louis Neilson,** general line foreman for Portland General Electric Co., to the position of assistant to the superintendent of distribution has been announced by PGE General Superintendent Walter Brenton. Moved up to Neilson's former job was **J. P. Armfield,** former assistant line foreman. In his new post Neilson will be concerned with line construction standards and practices throughout the service area and Armfield will have charge of line crews in the Portland division. Neilson has 28 years and Armfield 26 years of service with the company.

• **Alden F. Krieg,** Portland General Electric Co. lighting engineer, has been selected by the Portland Junior Chamber of Commerce as Junior First Citizen for 1953.

• **Henry H. Falkner** has been appointed branch manager of apparatus and supplies and **Francis T. Stephens,** branch manager of consumer products, for Westinghouse Supply Co. in Boise. Headquarters are at 318 Capitol Blvd.

• **Joseph M. Smyth** has been appointed sales training manager of Sues, Young & Brown Inc. His activities will include training the firm's salesmen and preparing a program for training retail salesmen.

• **Roy D. Constable** has been promoted from branch manager of consumer products for Westinghouse Electric Supply Co. at Portland, to manager of consumer products for the North Pacific district at Seattle. **Jack Hangauer** was named sales promotion manager for the district.



BORASCU®
WEED KILLER

BORASCU is the answer to your weed problems! Use this weed killer about stations, transformer and yard areas, fence lines, pole yards-lines, and all places where ground should be kept bare of fire-hazardous and unsightly vegetation. BORASCU destroys and prevents regrowth! A single application may keep an area cleared for 1 to 2 years! And this low-cost material is SAFE...nontoxic, nonflammable... won't corrode ferrous metals. Try it!

So Easy to Apply...

NO MIXING...
NO WATER TO HAUL
•
NONPOISONOUS
•
NONCORROSIVE
•

Write for Literature Now!

PACIFIC COAST BORAX CO.
DIVISION OF BORAX CONSOLIDATED, LIMITED
630 SHATTO PLACE • LOS ANGELES 5, CALIFORNIA

• **Ivan E. McDougal** has been named manager of Westinghouse Electric Corp.'s San Diego office, replacing **Ronald T. Strong,** who retired Jan. 1. McDougal, who has an electrical engineering degree from Kansas State College, joined Westinghouse in 1936. Later he saw active war service in the Navy as chief engineer with the rank of lieutenant commander aboard the escort carrier CVE-94. He rejoined Westinghouse as an application engineer in San Diego in 1946. Strong, who has headed the San Diego office since 1946, will become an engineering and sales representative for a Westinghouse distributor, Electric Supplies Distributing Co. He joined Westinghouse in 1919, served in the Seattle office for 12 years and was transferred to San Diego in 1939 as a sales engineer. He is a retired rear admiral in the U. S. Naval Reserve.

• **Kenneth L. Vore,** Los Angeles traffic executive and former director of transportation in the office of the Secretary of Defense, has been appointed general traffic manager for Westinghouse Electric Corp.

• **Ending 24 years** of service, **Harry B. Walker,** professor emeritus on the Davis campus of UC, has resigned as chairman of the California Committee on the Relation of Electricity to Agriculture. He has been succeeded by Professor **Roy Bainer,** chairman of the department of electrical engineering at Davis.

• **Eugene L. Cochnauer** took over his duties as superintendent of Hungry Horse Dam and power plant in January, when the Bureau of Reclamation project was transferred from construction to maintenance and operation. He has been at Hungry Horse since July 1951, as chief of the electrical and mechanical construction branch, specifically on the power house.

• **Phil Dickinson,** for more than seven years assistant regional director of the Bureau of Reclamation's Region II in Sacramento, has been appointed chief of an American Reclamation Advisory Mission to Turkey. He was accompanied to Ankara by **Carl Kadie** of the bureau's Denver staff, who is planning engineer on a team that ultimately will include 10 Americans.

• **Howard B. Wylie,** San Diego Gas & Electric Co., has been named general foreman of the operating department of the utility's new eastern division headquarters in El Cajon, Calif. He will be in charge until a superintendent is appointed.

Dundon

• **Art R. Fryklund,** Sacramento branch manager for Graybar Electric Co., retired Jan. 1 after 43 years service with the distributor. **Jack M. Dundon,** district power apparatus manager in San Francisco, for 17 years with Graybar, succeeds him as Sacramento manager. Fryklund started in the San Francisco house when Al Nichol was its manager. Dundon started in Oakland under Mark Wilkins.

Vernstrom

• **Roy N. Vernstrom** has been promoted by Pacific Power & Light Co. to the position of general sales manager. He was assistant general sales manager in charge of operations outside Portland, a post he took following service as advertising manager. **C. A. Root,** acting commercial manager for the past year, is now principal assistant to Vernstrom and **Louis P. Growney** is industrial development engineer.

• **Pacific Power & Light** Co. has transferred **Arthur M. Thrasher** from Enterprise to The Dalles as district manager. **Bernard O. Thomas,** former line superintendent at Hood River, succeeds him as Enterprise district manager. **James R. Dawson** was moved from the construction department to the Hood River line superintendent's job.

• **G. U. Cusack** has been appointed superintendent of the Pueblo line department of the Southern Colorado Power Co., succeeding **E. B. Hornbacker,** who retired. **A. J. Martin** has taken Cusack's former position as assistant superintendent of the department.

• **Joseph L. Polizoto** has been named manager of E. D. Bullard Co.'s Los Angeles office. He has been associated with the company since 1934 and has been assistant manager at Los Angeles since 1942.

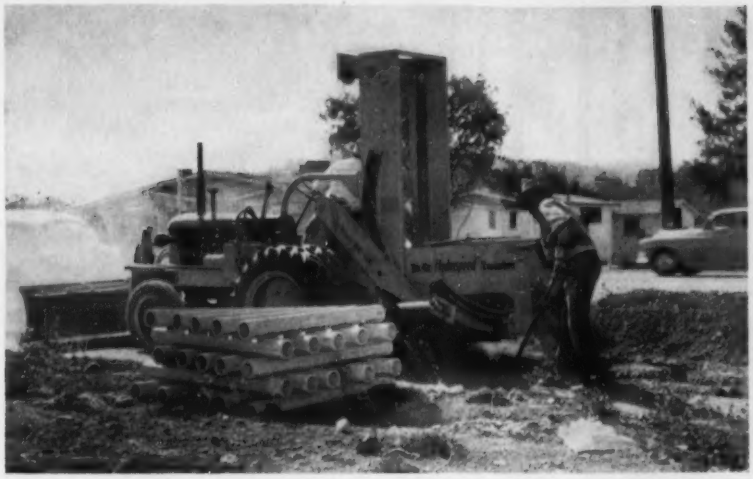
Deaths

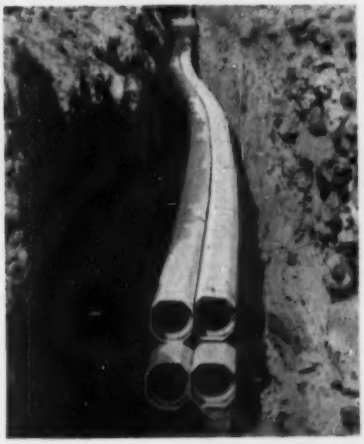
• **Charles Rump,** 69, who retired in 1946 as Western Colorado district manager for Public Service Co. of Colorado, died at Grand Junction, Colo., Jan. 7. At the time of his death, he was western Colorado representative for the Earl M. Scanlon Investment Co.

• **Mitchell C. Thorn,** 51, newly named assistant general manager for Pacific Power & Light Co., died Jan. 4 while recuperating from surgery. He had not yet taken over his new post at company headquarters. He had been district manager at Pomeroy, Wash., Seaside and later The Dalles, Ore. He joined PP&L in 1921 and took over The Dalles managership in 1949.

• **H. A. Van Norman,** 75, retired general manager and chief engineer of the Department of Water & Power, Los Angeles, and one of the chief builders of the Los Angeles aqueduct from the Owens Valley, died in December. Born in Texas, Mr. Van Norman moved to Los Angeles with his family in 1882. He joined the Department of Water & Power in 1907 as a construction superintendent. In November 1943 he was named general manager and chief engineer of the department when the separate water and power bureaus were merged into a single organization. He retired in September 1944.

• **Murray Rosenbloom,** sales manager of Globe Lighting Products Co. Inc., Los Angeles, died of a heart attack Dec. 26.





Streamlined production techniques, OCT-O-DUCT conduit add up to . . .

More Trench Feet per Shift in New 30-Mile Underground System

Thirty miles of 4-way and 6-way underground conduit in a single stretch south of San Jose, Calif., may be a record in itself. But contractors on the job agree that plenty of duct erection records were set. One crew laid 1600 trench-feet of 4-way duct structure in one working day—with only a regular 3-man erection team.

Well conceived specification by the utility, good planning by the contractors involved, and superior features of the new OCT-O-DUCT combined to make this record installation. The field-engineered features of the new flat-sided conduit proved out in this system which involved over 700,000 feet of duct.

Conduit was delivered from factory to trench-side just ahead of trencher. Laying crew followed close behind. One man attached couplings to stacked lengths; another passed pieces to man in trench who easily erected either 4-way or 6-way runs, as specified. 900 to 1600 trench-feet per shift became routine on this job.

What Contractors Liked

These features impressed contractors: Flat sides of OCT-O-DUCT eliminated spacer problems — convenient length permitted easy handling by one-man in deep, narrow trenches—simple, sturdy collar type coupling required no special tools in the field—the impressive strength of new OCT-O-DUCT — trench side delivery.

Man-holes were cast in place around prefabricated portable frames. Earth conditions for the most part were ideal, little or no shoring was required during pouring of concrete encasement. System was ready for cable within two months of starting construction.

Real Circuit Protection

The utility which designed this system knew from experience that smooth Soapstone conduit had unsurpassed electrical and chemical characteristics for permanent circuit protection. It had learned before that Soapstone is the most satisfactory and least expensive duct system. The speed of laying which moved this job ahead of schedule was an additional plus value. So was the lower cost per trench-foot bid by contractors on later sections of the job after they found what they could do with Soapstone OCT-O-DUCT.

If you are not using OCT-O-DUCT on your underground duct jobs you may not be getting the best circuit protection your money can buy.

New Installation Manual

A brand new OCT-O-DUCT Installation Manual is available for the asking. This incorporates much of the experience on the 30-mile system described here, plus the best of the know-how of electric and telephone utilities, municipal and industrial users of Soapstone conduits over the past quarter-century. Send for a copy today. Write:

SOAPSTONE DUCT COMPANY

110 Linfield Drive, Menlo Park, California

Distributed in the West By

MAYDWELL & HARTZELL, INC.

San Francisco · Los Angeles · Phoenix

Portland · Seattle · Spokane

Your Best Connection ILSCO

Tough hard-worked electrolytic copper connectors

ASK FOR 80-PAGE CATALOG

Mechanically Rugged U/L Tested

XT MODEL 6 SIZES #14-500 MCM

MANY MILLIONS IN USE

Out-perform cast alloys—greater conductivity—cooler operation—more economical

ILSCO COPPER TUBE AND PRODUCTS, INC.
5748 MARIEMONT AVE. • CINCINNATI 27, OHIO

Overhanging branches removed and trees shaped properly for Utility in Beverly Hills

SURGICAL LINE CLEARANCE BY DAVEY

Davey is doing line clearing for 12 Public Utilities on the Pacific Coast —most of them served continuously for over 20 years. Davey specialized equipment and efficient methods save money . . . Davey surgical pruning benefits trees—builds goodwill.

DAVEY LINE CLEARING
DIVISION OF
DAVEY TREE SURGERY CO., LTD. OF CALIFORNIA
Russ Bldg., San Francisco, SUtter 1-3377
Story Bldg., Los Angeles, TUcker 1929

DAVEY ORIGINATORS OF TREE SURGERY

NOTES ON THE TRADE

Bright Future Predicted For Electrical Industry

Indicative of the bright future ahead for the electrical industry Westinghouse is setting its sights on an annual sales capacity of $2,100,000,000 for 1957 as compared to $1,600,000,000 for 1953, according to Mark W. Cresap Jr., vice-president and assistant to the president. Cresap visited the West Coast last month and spoke before the Security Analysts of San Francisco.

Among the products and lines with particularly dynamic futures Cresap listed these: Increased capacities in power apparatus; higher generator ratings with smaller and more compact equipment; industrial applications of electronic controls; microwave communications; transitors; gas turbine power units; automatic, high-speed elevators; low-cost residential heating and air conditioning equipment including the heat pump; dishwashers and garbage disposal units—"sleeper" he called them; color TV; and the practical industrial application of atomic power.

Cresap

Improvement in market position, particularly for the next couple of years, will take "more than a bit of selling," he believes. Westinghouse is stepping up its sales and promotional activities accordingly, he indicated.

• **George L. Beaver** has been named manager, apparatus sales, for the Oakland office of General Electric Co. He had been in the San Francisco office since 1922.

STRENGTH, ENDURANCE that Meet the Test!

Crapo

Guy and Messenger Strand

IN THE FIELD as in laboratory tests . . . **Crapo** Galvanized Steel Strand proves itself capable of withstanding severe punishment. Steel's inherent strength and durability are combined with definite economies in every size and grade of **Crapo** Steel Strand. You'll find the heavy, ductile, tightly-bonded zinc coatings, applied by the famous **Crapo** Galvanizing Process, provide lasting protection against corrosion.

Contact your jobber of Crapo Galvanized Products or write direct for further information!

INDIANA
STEEL & WIRE COMPANY
MUNCIE, INDIANA

HOW TO test, repair and service all home electrical appliances

This handbook contains all necessary electrical and mechanical fundamentals—with over 700 illustrations—sectional, exploded, operational views—picturing details of appliance construction, operation, and servicing. Explains the WHY and HOW of electrical devices . . . gives advanced methods and technical know-how to solve everyday problems.

854 pages
727 illus.,
$9.00

ELECTRICAL APPLIANCE SERVICING By WILLIAM CROUSE

Formerly Dir. of Field Education, Delco-Remy Div., General Motors Corp.

Shows How to Service and Repair

- heaters
- washing machines
- fans and blowers
- irons and ironers
- air conditioners
- ranges
- broilers and roasters
- water heaters
- clothes dryers
- food mixers
- etc., etc.

Begins with basic principles of electrical and mechanical machinery operation. Then it proceeds through home wiring systems, to resistance-heating appliances, motor-driven appliances, and refrigeration and air conditioning appliances . . . covering construction, operation, and servicing of each.

SEE THIS BOOK 10 DAYS FREE

McGraw-Hill Book Co., Inc., 330 W. 42nd St., N.Y.C. 36. Send me Crouse's *Electrical Appliance Servicing* for 10 days' examination on approval. In 10 days I will remit $9.00, plus a few cents for delivery, or return book postpaid. (We pay for delivery if you remit with this coupon; same return privilege.)

Name.....
Address.....
City..... Zone..... State.....
Company.....
Position..... F West 2/54

This offer applies to U.S. only.

• **Appointment** of **E. G. Ryman** as Western regional sales manager for A. B. Chance Co. has been announced by **J. T. Isbell,** vice-president in charge of sales. Ryman formerly was Chance district manager in the Northwest. In his new position he will have supervision of the company's sales in the 11 Western states and will make his headquarters at the San Francisco plant, 815 Tennessee St.

• **A color film** available from Aluminum Co. of America gives a demonstration of the latest techniques in the welding of aluminum pressure vessels. The 28-minute, 16-mm film, *Welding Advances With Aluminum,* may be borrowed for group showings. Requests should be made on business letterhead to Motion Picture Section, 818 Alcoa Bldg., Pittsburgh 19, Pa.

• **Allis-Chalmers** has named the W. H. Eddy Electric Products Inc., 957 E. Van Buren, Phoenix, as distributor for its transformers in the state of Arizona and in parts of New Mexico. **W. H. Eddy** is president and **F. L. Carrigan** is secretary-treasurer of the firm, which was established in 1947.

• **Edwin D. Murray** has opened an office in the Russ Bldg., San Francisco, as consulting engineer to utilities and industries. He previously was chief of utilities engineering for the Atomic Energy Commission. An engineering graduate of the University of California, he formerly was with utility organizations in the West, including PG and E, Southern California Edison and Coast Counties Gas & Electric. He also has served with the California State Engineers office and the National Production Authority.

• **Fred L. Barber** has joined the O. B. Wilt Co., manufacturers' agent with offices in the Western Merchandise Mart, San Francisco. Barber will service all contacts for Presteline built-in ranges with electrical jobbers in the Bay area, and in central and northern California.

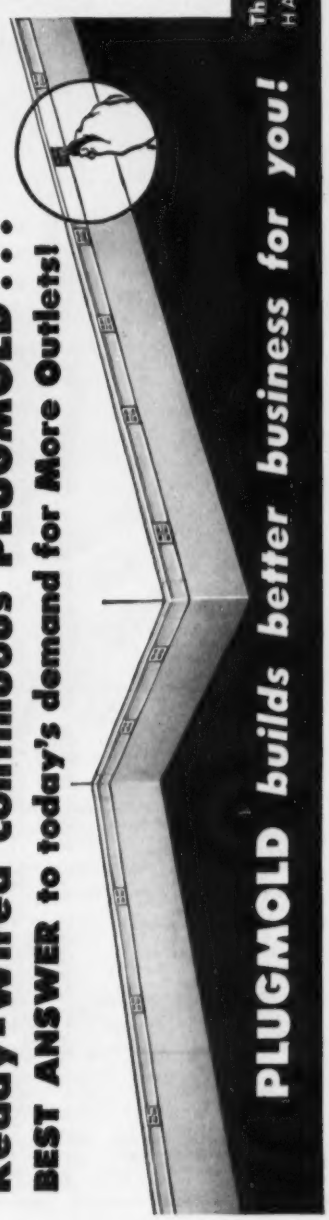
• **The General Electric** Co. Lamp Division moved its Salt Lake City office in the Rocky Mountain sales district to 249 E. Fifth South St. **Don R. Dyrenforth** and **T. Dale Brown** make it their headquarters.

• **Leach Industries** has been formed from a merger of Leach Relay Co., Jeffries Transformer Co., Palmer Electric Mfg. Co. and Inet Inc., all of Los Angeles. A 20-acre tract in North Long Beach has been purchased on which to build a new plant to house all four companies.

Ready-Wired continuous PLUGMOLD . . .
BEST ANSWER to today's demand for More Outlets!

PLUGMOLD ready-wired multiple outlet systems for continuous electrical outlets in homes, factories, stores or offices are easier, faster and cheaper to install! Write for full information.

The WIREMOLD Company
HARTFORD 10, CONNECTICUT



PLUGMOLD builds better business for you!

INDEX TO ADVERTISERS
February 1954

Allis-Chalmers Mfg. Co. 13, 24, 25, 41, 69
Aluminum Co. of America 28, 29
American Tel. & Tel. 40
Anaconda Wire & Cable Co. 171

Baldwin-Lima-Hamilton Corp. 6
Benjamin Electric Mfg. Co. 33
Brewer-Titchener Corp. 4, 5
Briegel Method Tool Company 153
BullDog Electric Products Co. 51
Burton Equipment Co., Inc. 160

Cable Spinning Equipment Co. 58
Chance Company, A. B. 21
Chase-Shawmut Company 62
Cole Electric Company 172
Condon Company, Earl S. 164
Copperweld Steel Company 23
Cornish Wire Company 152
Crouse-Hinds Company 44
Curtis Lighting, Inc. 22

Davey Tree Surgery 168
Day-Brite Lighting, Inc. 37
Delta-Star Electric Div., H. K. Porter Co., Inc. 26
Driver-Harris Company 66

Electrical Fittings Corp. 156
Electrical West 60
Everstick Anchor Company 160

Fargo Mfg. Co., Inc. 31
Fisher-Pierce Company 30

G & W Electrical Specialty Co. 35
General Electric Co.:
Cleveland, Lamp Div. 1
Schenectady, Apparatus Div. 17, 18, 19, 20, 47, 48, 49, 59, 74, 138, 139, 154, 155
General Electric Supply Co. 10
Graybar Electric Co., Inc. 67

Hann Co., George E. 156

Ilsco Copper Tube & Products, Inc. 168
Indiana Steel & Wire 169
I-T-E Circuit Breaker Co. 8, 9

Johns-Manville 12

Kaiser Engineers 142
Kearney Corp., James R. 14, 15
Kerite Company 149
Klein & Sons, Mathias 54
KPF Electric Company 71
Kuhlman Electric Co. 55

Line Material Company 3
Locke Department General Electric Co. 38, 39
Maydwell & Hartzell, Inc. 34
McCabe Powers Auto Body Company 11
McGraw-Hill Book Company 169
Moloney Electric Company 7, 147

Natvar Corp. 163
New England Mica Company 160

Ohio Carbon Company 32
OZ Electrical Mfg. Co., Inc. 70

Pacific Coast Borax Company 165
Pacific Coast Electrical Assoc. 4th Cover
Pacific Electric Mfg. Corp. 137
Pacific Gas and Electric Co. 3rd Cover
Panama Lamp & Commercial Company 160
Porcelain Products, Inc. 56
Preformed Line Products Company 42, 43

RLM Standards Institute 63
Revere Electric Mfg. Company 148
Rome Cable Corp. 144, 145

Sherman Mfg. Co., H. B. 148
Simplex Wire & Cable Company 45
Smith Company, S. Morgan 16
Smoot-Holman Company 159
Soapstone Duct Company 167
Southern California Edison Company 2nd Cover
Spang-Chalfant Div., National Supply Co. 57
Sperti-Faraday Company 152
Square D Company 141
Standard Oil Company 61
Steel City Electric Company 72
Sunbeam Lighting Company 27
Sylvania Electric Products, Inc. 146

Tel-E-Loct Products, Inc. 164
Thomas & Sons Company, R. 52, 53
Triangle Conduit & Cable Company 161

U. S. Rubber Company 73

Victor Insulators, Inc. 65

Wagner Electric Corp. 150, 151
Western Insulated Wire Co., Inc. 36
Westinghouse Electric Corp. 143
Wiremold Company 169

PROFILES

PETERSON

O'BRIEN

Recent promotions and transfers in the 11 Western states have affected these men and organizations in the electric industry:

Southern California Edison named three new vice-presidents, E. R. Peterson, Robert P. O'Brien and J. H. Mead. Mead and O'Brien were formerly assistant vice-presidents, Peterson was assistant comptroller

Lawrence G. Maechtlen, vice-president of Square D Co., was named manager of its Western Division. He had been a director and vp of that organization since 1951

James M. Humphrey was named district sales manager for Denver area by Appleton Electric, succeeding I. W. Strong. Strong was moved to Chicago as assistant to vice-president in charge of company sales

MAECHTLEN

MEAD

HUMPHREY

The section of Duraline has been photographed with covering unsaturated to show construction.

SERVICE DEPENDABILITY

Duraline, like a rosebud, keeps moisture out

Duraline's unique construction — an exclusive continuous interlocked fibrous sheath, thoroughly impregnated with URC saturants, then covered with URC finishers—provides finest weatherproof performance and service dependability. Won't festoon, stays right there on the job. Provides added protection against contact with foreign objects.

Duraline* is your best insurance against bad weather. Only Anaconda makes a line wire like this. Available with copper, Copperweld or aluminum conductors. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

*Reg. U. S. Pat. Off.

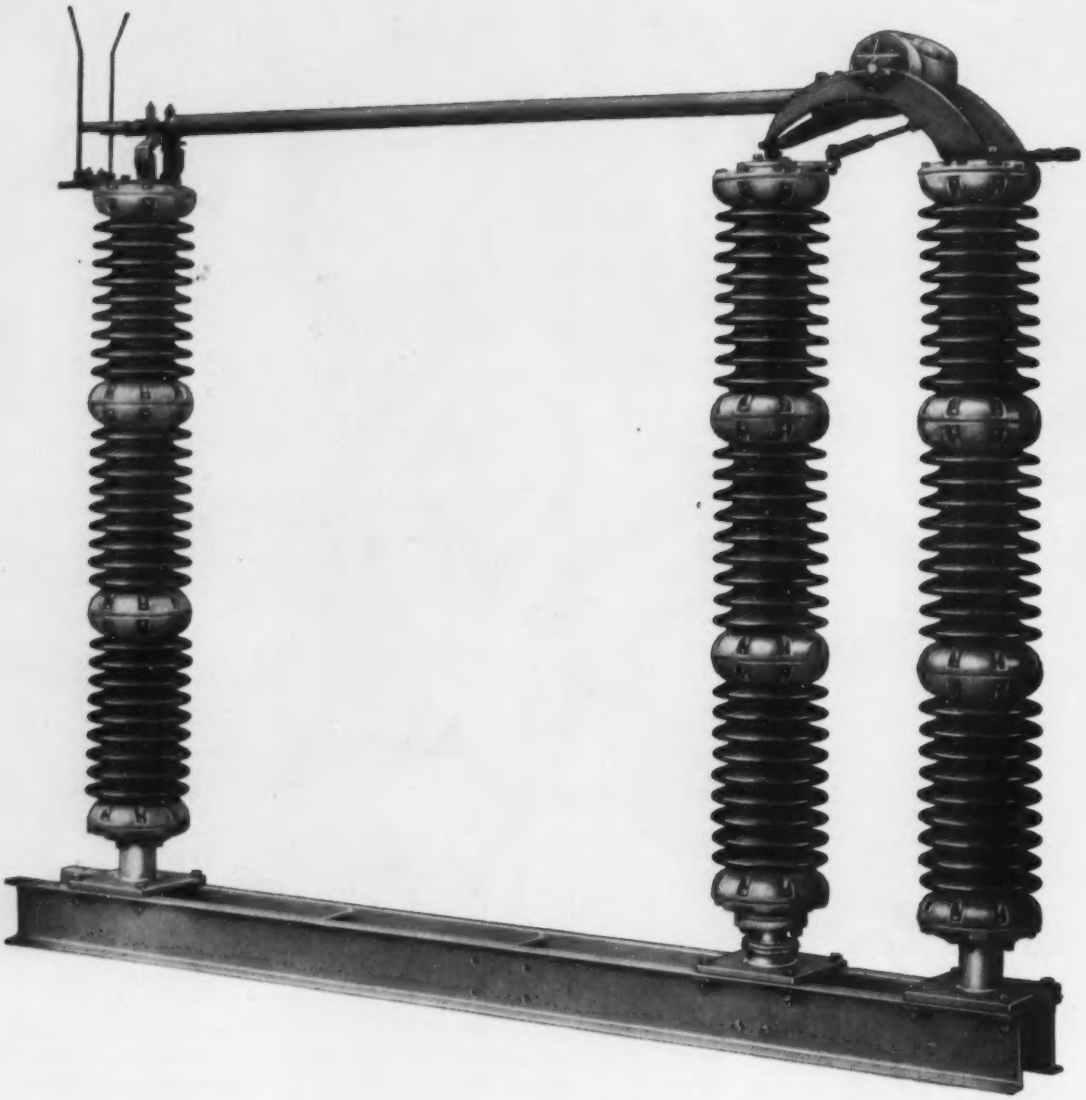
ANACONDA®

service and overhead distribution cables, both bare and weatherproof, including ACSR • signal, control and communication wire • portable cords and cables • network cables • airport and street lighting cables • mine cables • magnet wire • copper, aluminum, and copper-weld conductors • wire and cable accessories.

ANACONDA ON THE PACIFIC COAST: Plant at: Orange, Calif. District Offices at: Los Angeles, Calif.; San Francisco, Calif.; Seattle, Wash.

Cole Electric Co.

8439 Steller Drive TExas 0-4701 Culver City, Calif.



AIR BREAK DISCONNECTING SWITCH

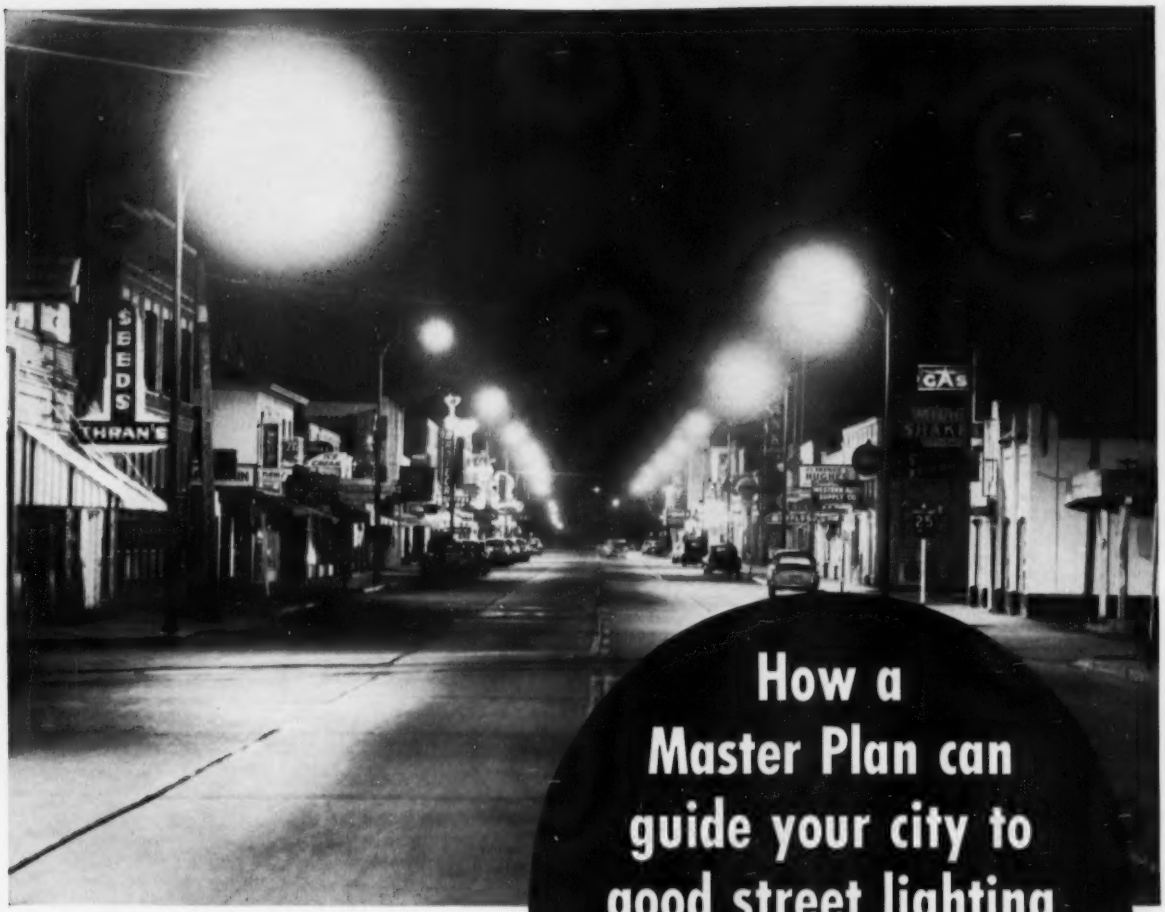
161,000 Volts—600 Amperes—Type 0-2

Horizontal Mounting—Three Pole—Single Throw—Group Operated

SILVER TO SILVER CONTACTS

One Pole Shown

See Bulletin 46A



How a Master Plan can guide your city to good street lighting for years to come

Here's what one did for Manteca, Calif.

Modern street lighting like this, recently installed in Manteca, Calif., is based on a Master Plan drawn up by P. G. and E. to cover the city's needs for at least 10 years. Manteca's new system produces over 3 times as much light per operating dollar as its old one, and can be expanded gradually to keep up with changing needs.

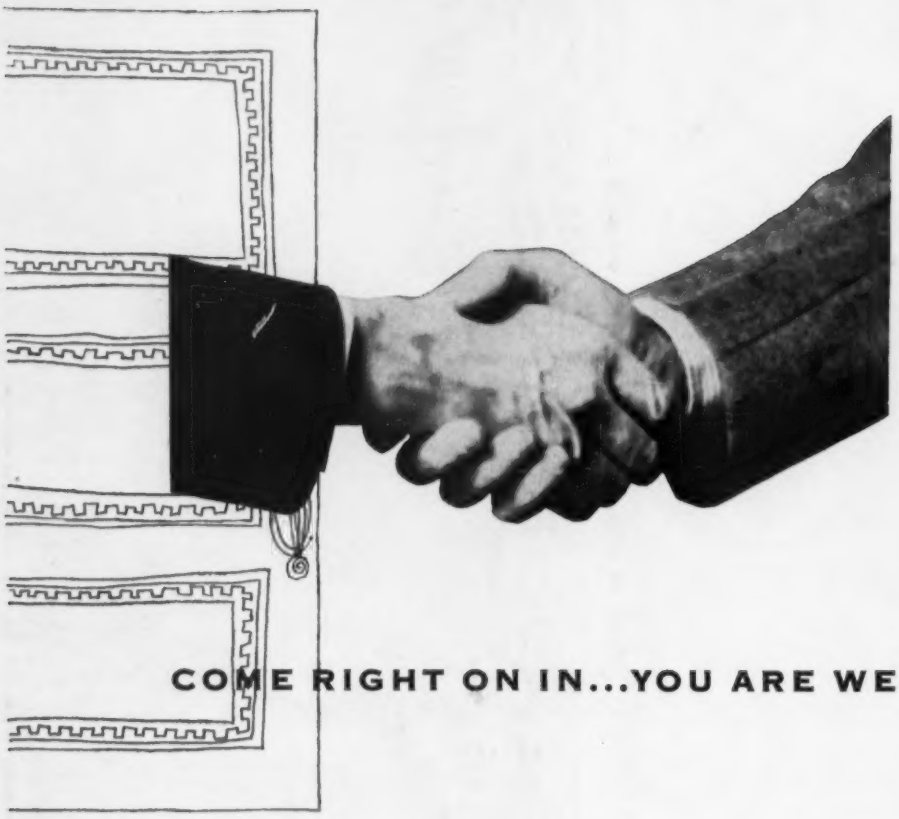
"Our new lighting system gives Manteca a brighter, cleaner look, makes our streets a lot safer at night. And with a Master Plan to follow, we'll no longer have any doubts that our lighting is all it should be," says the Honorable Carl N. Hansen, Mayor of Manteca.

P. G. and E. will gladly make a free survey of your city's street lighting and submit a Master Plan for any improvements needed. Remember: good street lighting is more than paid for by the saving of lives and property. And long-range planning enables you to spread the relatively small cost over a period of many years.

For a free survey of your city's street lighting, contact your local P. G. and E. Office.

P·G·and E·
PACIFIC GAS AND ELECTRIC COMPANY

404-X-2



COME RIGHT ON IN...YOU ARE WELCOME!

We aren't just "glad-handing"—we mean it! P.C.E.A. is an organization of people in the electric industry. If you are in the electric industry—any branch—you belong. So why not come in and join us officially? You'll find it worthwhile—and what is more, you'll enjoy being one of us.

P.C.E.A. has a busy program planned for '54 and the record will show that P.C.E.A. programs are usually carried out. If you aren't a member, we urge you to join. If you are already a member, we urge you to be an active member. This is a "do something" organization with a special place in it for "do something" men and women. Get full information from either of our offices.

Associations do the things
most people think just happen.

PACIFIC COAST ELECTRICAL ASSOCIATION

530 West Sixth Street, Los Angeles 14, Calif. • 681 Market Street, San Francisco 5, Calif.